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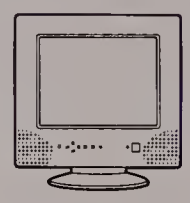

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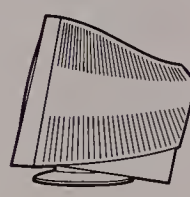

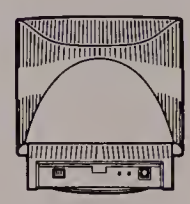

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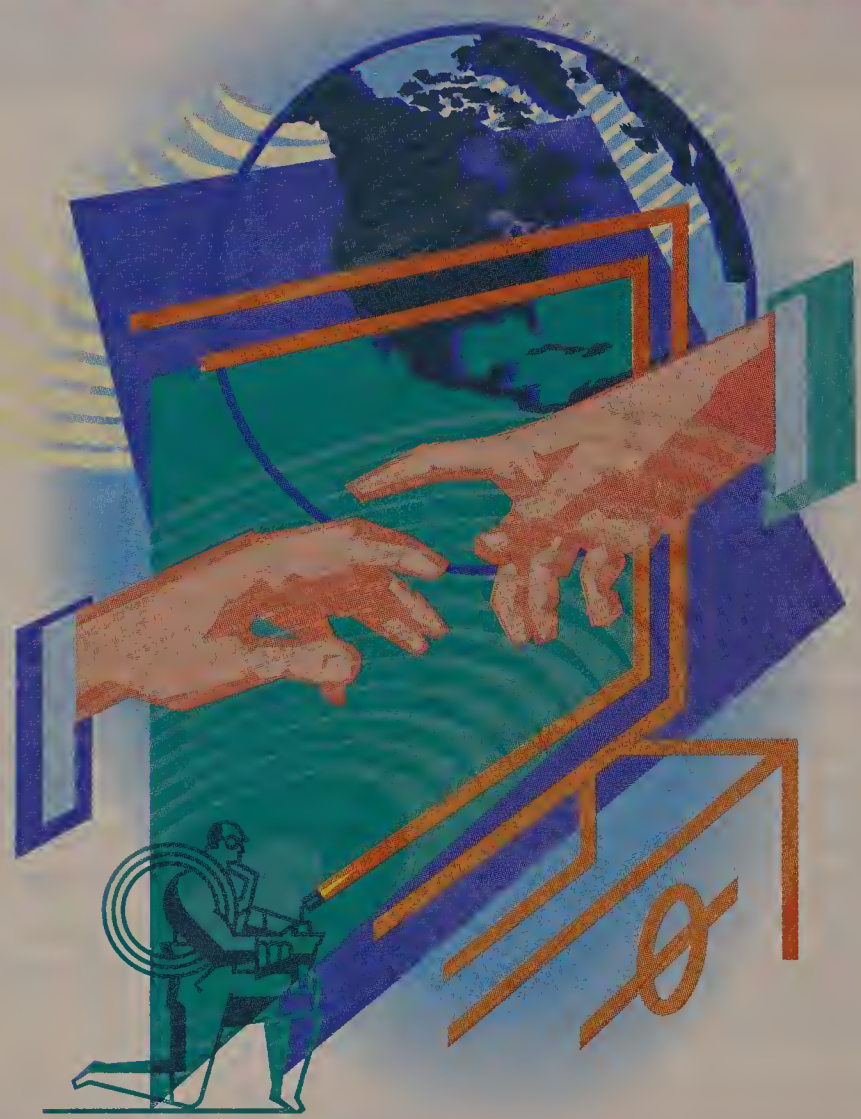

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Preview this year's holiday CD-ROMs: from stellar warfare in Perfect Weapon to hot new film- and TV-based games, including Mission: Impossible and Star Trek.

240-M4 Hardware and Software Reviews
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240-M12 Title Reviews
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240-M20 Multimedia Authoring: If You Build It, They Will Come
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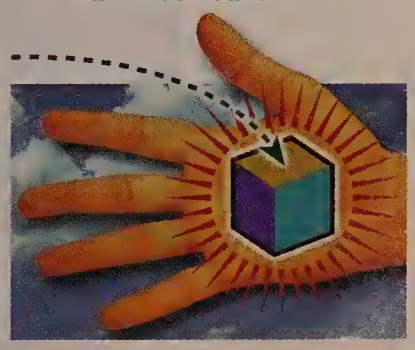

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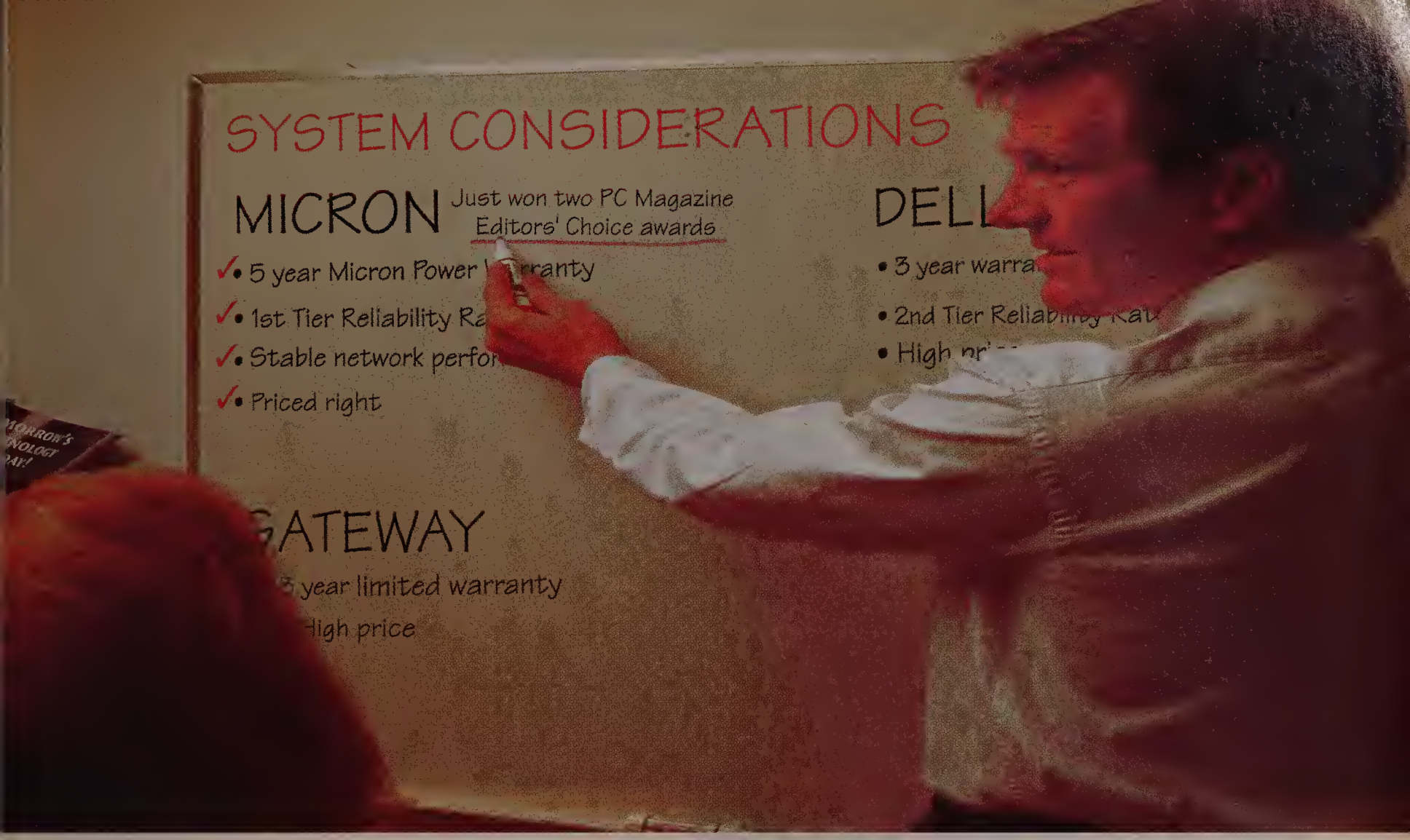

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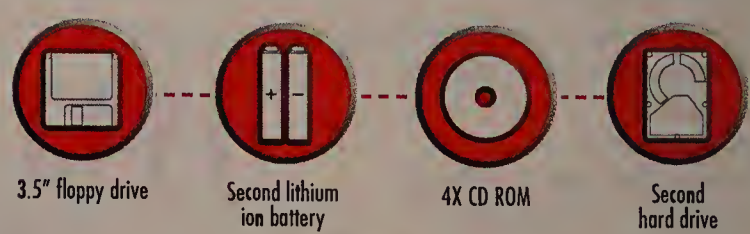

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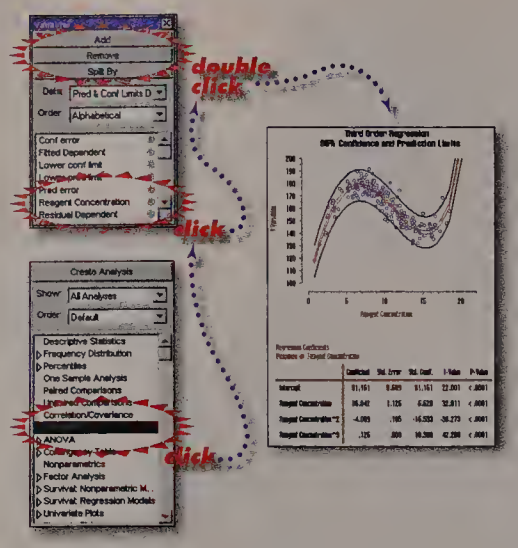

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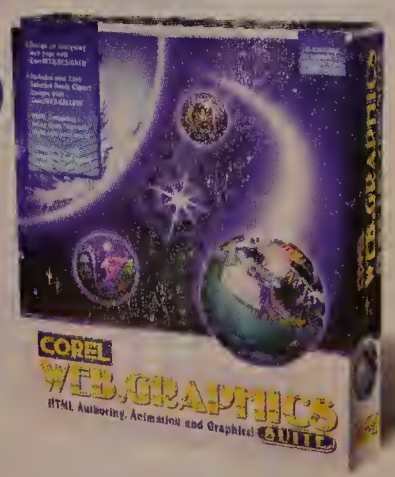

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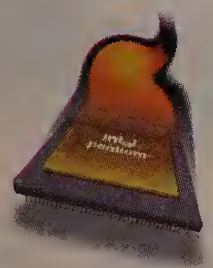

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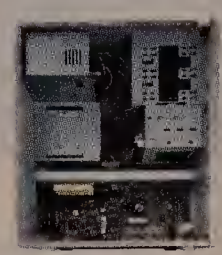

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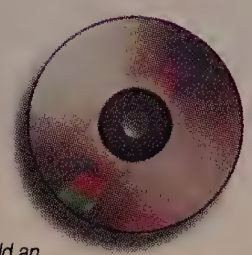

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Welcome to PC World Multimedia Edition

Welcome to the first multimedia edition of *PC World*. Multimedia and the Internet are the two most vibrant topics in computing, and you'll find plenty about each in this issue. While limits on transmission speed keep the Internet from providing lively animations, you can create them for yourself with multimedia authoring tools. Full-motion video clogs the Internet like a goat in a python, but your own multimedia software can include MPEG video that rivals VHS tape. In "If You Build It, They Will Come" in our special multimedia section, you'll find the best software for creating multimedia productions. The special section also reports on new CD-ROM titles due next Christmas, reviews titles available now, lists the Top 5 CD-ROM drives and sound cards, and offers tips to help you make it all work.

Surviving on the Internet

Like multimedia in its early days, the Internet has enormous strengths, vast potential, its own jargon, and expectations that can't be met as quickly as claimed. The Internet offers rich stores of information and greater interactivity than any other medium. But it also forces you to endure waits that seem longer than your expected life span. It lets you exhaust yourself pursuing vital inquiries from one irrelevant textual wilderness to another. It chokes you on hype and jargon: Where else but on the Internet can your avatar surf through the URLs of cyberspace, looking for a MUD that accepts micropayments in cybercash, shunning all those who would spam, spoof, or flame you? You need a survival guide, and you'll find it in this month's cover stories.

Survival starts with neutralizing hype, beginning with "cyberspace" itself. This remarkable new realm consists almost entirely of screenfuls of text with scattered attempts at something more. The best cyberspace pages make ordinary printed matter look like high art, while the best cyberspace animations dawdle, compared to familiar TV cartoon characters now old enough to collect Social Security.

The modestly enhanced text of cyberspace may contain invaluable information, but chasing it down wastes time and money. "42 Tips for Taming Cyberspace" will help you get more done while online and spend less money doing it.

Untangling the Web

The World Wide Web seems more like the World Wide Wait if you're using anything but ISDN or fast T1 connections. Once you succeed in installing one of the products recommended in "Best ISDN Modems," you can skip the waits caused by your own local bottleneck, though you'll still face delays from distant servers.

A search engine gropes through the uncharted text of the Internet and, if you're lucky, recommends 2 sites worth investigating along with 98 that aren't. All too often, a Ouija board would do as well. But there's an alternative. In many cases, commercial online services still offer the best information and do the best job of helping you find it. Are they worth the price of admission? "Best Online Services" compares their costs and benefits and explains when and why you might want to disentangle yourself from the Web.

The term *browser* violates an Internet canon by understating the capabilities of the software it names. A browser not only lets you browse, it also lets you read text, write messages, and download applets that expand the browser's capabilities. Which is the right browser for you—Netscape's Navigator or Microsoft's Internet Explorer? Find out in "Best Web Browser."

Cyberspace wouldn't be half as pretentious without *avatars*—screen icons that act out fantasy lives for people who have trouble fantasizing on their own. Far from incarnating anything divine or human, cyberspace avatars are conceptually identical but visually inferior to a backyard gathering of 5-year-olds pretending to be Power Rangers. Serious business and personal relationships do happen online, but you need more than an icon to handle them correctly. You need to learn how to conduct yourself so you don't run afoul of the law. You'll find straightforward advice in "What You Can—and Can't—Get Away With Online."

Full-motion video clogs the Internet like a goat in a python, but your own multimedia software can include MPEG video that rivals VHS tape.

Strip away the hype, jargon, and pretense, and you'll find great power and utility in what the Internet offers today. There is no need to jeopardize its broad acceptance by continuing the current orgy of inflated claims that are sure to disappoint public and corporate expectations. The Internet will get more useful and entertaining, but give it attainable goals. In the land of dizzy virtuality, it's time to get real.

Phil Lemmons

Phil Lemmons, Editor in Chief

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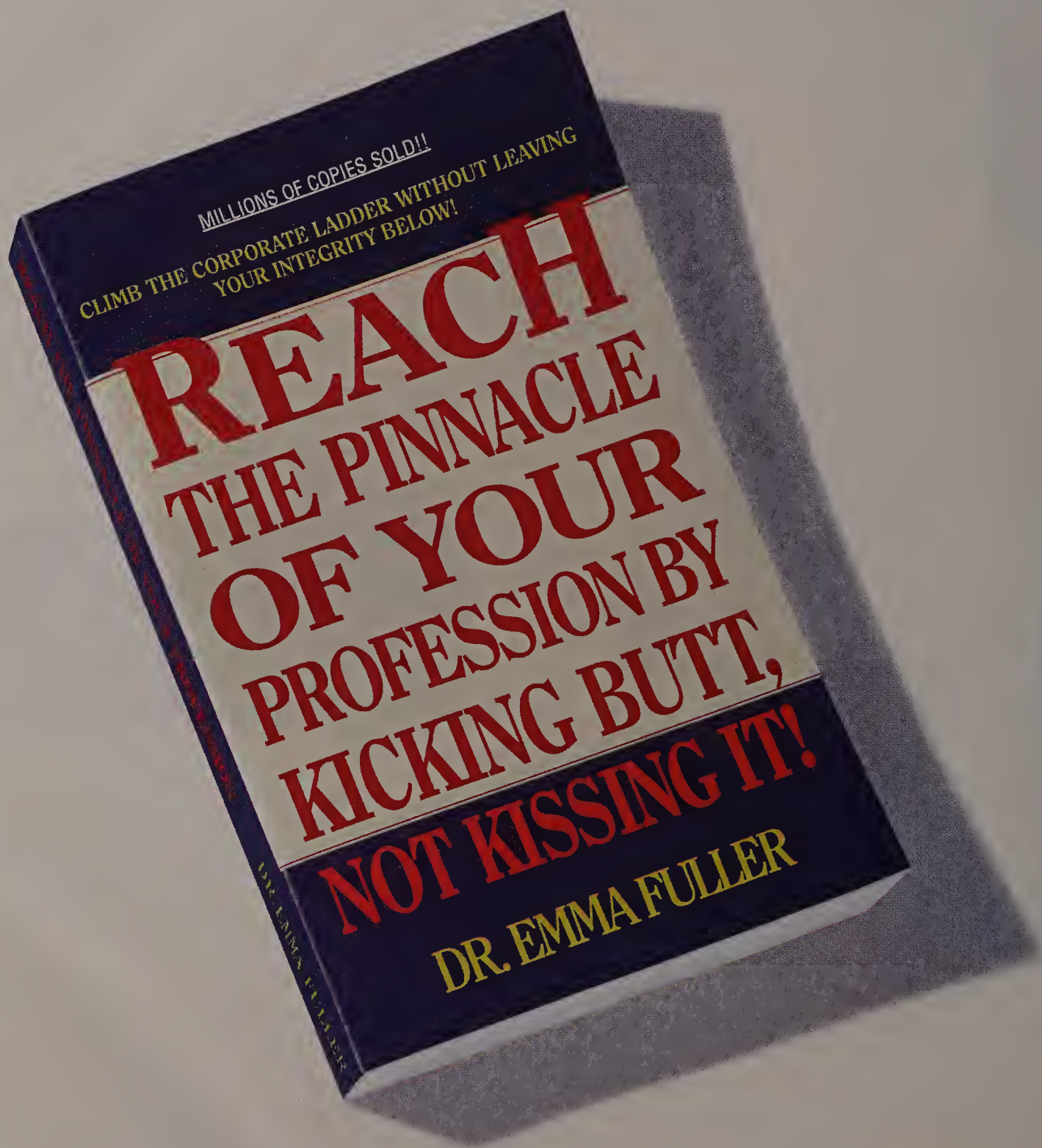

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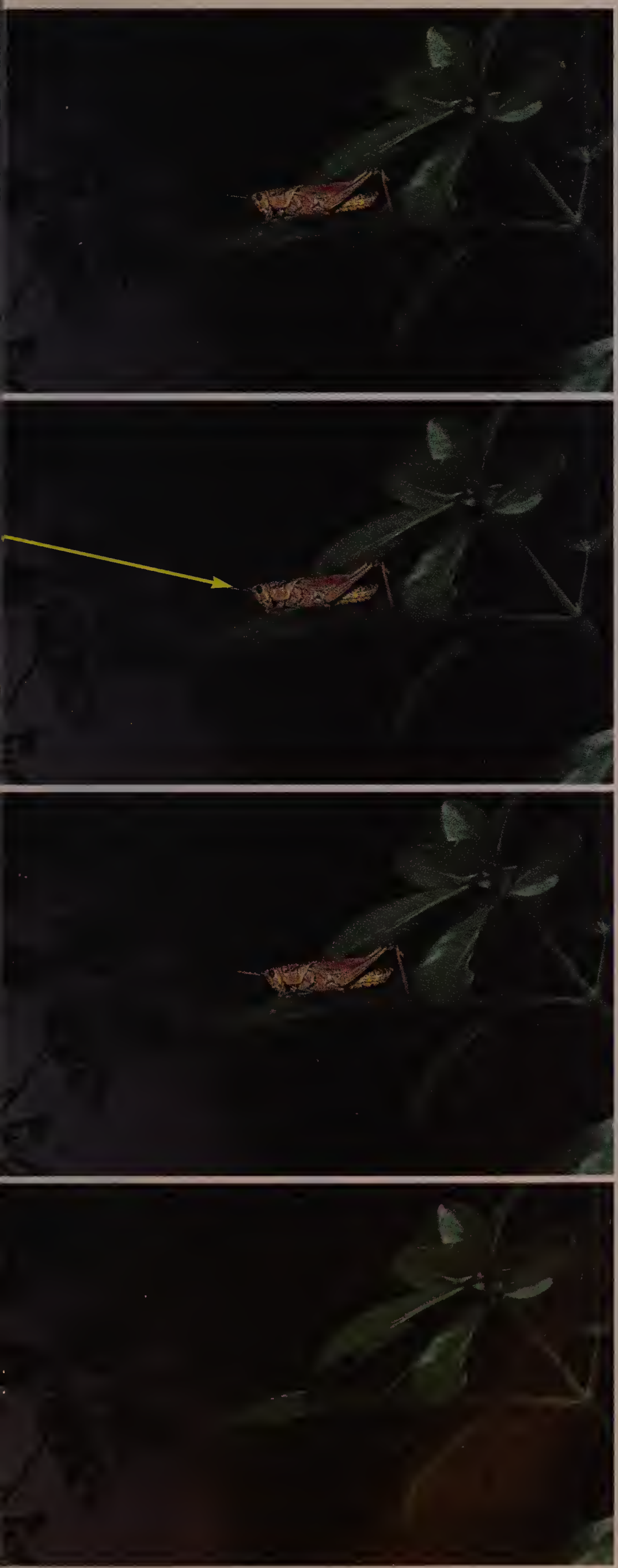

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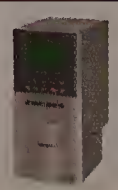

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Coming Clean About Used Parts, Why Pay for Utilities?

Factory Freshness Taken to Task

As a new subscriber to *PC World*, I found your article on used parts informative and gutsy ["How New Is Your New PC?" June]. My guess is you made no friends with hardware manufacturers, but you put your readers first.

I purchased a refurbished NEC monitor recently. The box and monitor were clearly labeled "refurbished," and the discount was good. I have no problem buying used parts when the manufacturer is honest about it up front, but I resent companies hiding the fact and charging more than they should.

Bernard Kingsley, Worcester, Massachusetts

In a Perfect, Brand-New World

I couldn't agree with you less ["How New Is Your New PC?"]. In a perfect world everything would be brand-new and cheap. If a car has a flaw, do you melt it down and try again? If a computer is returned because the CD-ROM drive doesn't work, do you destroy everything?

Scrapping usable hardware components to satisfy the dream of a perfect world would put a computer company out of business, or at least it would price the machines beyond my reach. The manufacturer should be honest, but for my money if the merchandise works as good as new, then I'm satisfied it *is* as good as new.

Hank Borgman, Farmington, Michigan

Customers Fight Back

Kudos for your article about Gateway 2000 and its deceptive advertising ["Anniversary PC Owners Fight Gateway—And Win," *Top of the News*, June]. If more of the print media had your kind of courage, maybe these direct marketers would be forced to clean up their act.

If a company in just about any other industry was caught arbitrarily substituting parts without telling the customer beforehand, it would probably be the subject of an investigation and a lot of litigation.

Ron Vernon, Long Beach, California

Commitment to Readers Is Clear

Let me congratulate you on "Anniversary PC Owners Fight Gateway—And Win," an article that—like many in the past—shows your commitment to your readers. Knowing the value a big advertiser may represent to you, we should appreciate your unambiguous viewpoint all the more.

Johann Schwarz, Paris, France

How New Is Your New PC?

Computer companies often use old parts in new PCs. Does this little-known practice affect your PC's performance or reliability? Maybe. Do you have the right to know about it? You bet!

By Roberta Furger

Satisfied With Gateway

Thanks for the article on problems some owners have had with the Gateway 2000 10th anniversary edition computers. I bought one last October and have been quite satisfied with it, having no problems at all.

I did contact Gateway to ask if I qualified for any of the exchanges or refunds mentioned in your article, and received a replacement for the CD-ROM drive the day after I called. The whole business was handled efficiently, and my new drive works quite well. Further, my experience with Gateway's technical support department has been very satisfactory.

I think the company made a major mistake by misrepresenting the components in their 10th anniversary edition computer, but they handled my concern quite satisfactorily. I'm not going to hold this error against them.

Mel Kozek, Rochester Hills, Michigan

Reason Number 300

Your article "Complete Guide to Windows Utilities" [June] makes the point that Windows 95 right out of the box is wrong for a number of reasons. But if you add third-party defraggers, uninstallers, and diagnostic and other utilities, then you'll have a workable program.

How wonderful. Not only do I have to pay about $100 for the GUI, I then have to shell out another $300-plus for the programs Windows needs. No thanks! You've given me 300 more reasons not to switch.

Patrick Welch, Oregon, Ohio

More PCs, Less Performance Data

Your recent change to the Top 20 PCs ranking scheme [June] is great in that it gives your readers more computers to look at, but I believe you're excluding some important information. I have always cross-checked performance ratings for different systems, but I can no longer compare the performance of the top machines [within a particular product line].

On the Top 20 Power Desktops chart this month, the only performance and pricing information I can get for a Dell Dimension is for the XPS P133c—but I might be interested, for

example, in how the Dell XPS P166s compares to the Micron P166 Millennia Plus. If you could continue to provide this information, it would be helpful.
Bruce McCready, Internet

Editor's response: You are not the only reader to miss having performance numbers for the top systems we no longer rank. Space is too tight to include them in the print version of *PC World*, but keep an eye on PC World Online. We're constantly expanding the online version of the magazine and eventually hope to provide more details there on all Top 20 systems. —*Carla Thornton, senior reviews editor*

Grateful to the Max

Just wanted to thank you for Scott Spanbauer's article "Fax to the Max" [June]. I was not even aware I had fax and e-mail capability built into my Windows 95 program. Much to the credit of Scott's article, I'm up and running with an effective fax capability (albeit somewhat limited—but hey, it doesn't cost any extra). I confirmed my setup by calling a few fax-on-demand numbers and received successful faxbacks. Thanks, Scott, and thanks, *PC World*—you made my day!
Tom Nyquist, Internet

A Human Perspective on Refresh Rates

Special thanks to Doug Fine for "Hands-On Guide to No-Pain Computing" [June], particularly the caution that "more sensitive souls may notice [screen] flicker even at higher rates [than 72 Hz]." I don't know how many times I've read that flicker is undetectable to the human eye at refresh rates of 75 Hz or higher. I'm very human, and I can still see flicker at 80 Hz.

Convinced that my $2000 monitor was not to blame, I recently replaced my Diamond Stealth64 3400XL graphics card with the Imagine 128 Series 2 so I could get refresh rates higher than 70 Hz in true color at a resolution of 1152 by 864. Diamond had claimed to support this mode at 90 Hz, but despite statements to this effect in their manual and on the box, they finally admitted that 70 Hz was the "real" maximum (refresh rates for other resolutions in true-color mode were also inflated). Now I run all resolutions up to 1280 by 1024 in 16- or 32-bit color at 85 Hz or higher. For me, that is flicker free.
Ken Stillwell, San Francisco

Speaking Up for Internet Phones

In reference to your article "Internet Phones: Nice Idea...But No Match for Ma Bell" [June], let me give you a commonsense reminder: No one said Internet phones would replace Ma Bell just yet. I have a 486 with the Creative Labs Sound Blaster AWE 32 sound card, as do my in-laws. I live in Florida and they live in Tennessee. We have arranged Tuesday nights as online nights, and if we find each other online, we can speak to each other. I use the Internet Phone by Voltec, and I've had no problems with the audio quality. Now the sound is by no means Ma Bell quality, but it is still very audible.

So don't give the Internet phone such a bad name. It was never meant to replace the telephone; not yet.
John Wyman, Lake Worth, Florida

Corrections and Clarifications

Our May system review ("Pentium-166: The New Standard of Power") should have stated that the Toshiba Satellite T2130CS notebook computer can indeed display on both its built-in screen and an external monitor at the same time.

A photo caption for the Quantum Bigfoot hard drive in "A Gigabyte Drive for $199?" (May) should have said the Bigfoot uses an empty CD-ROM drive bay.

We received inaccurate information from the vendor for June's *Top 10 Modems*. Microcom does not provide toll-free technical support.

The Top 20 notebook reviews for June and July should have stated that Texas Instruments does in fact offer weekend technical support.

PC World regrets the errors.

Letters *welcomes your responses and ideas.* *See page 14 for contact information.*

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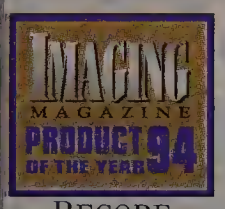

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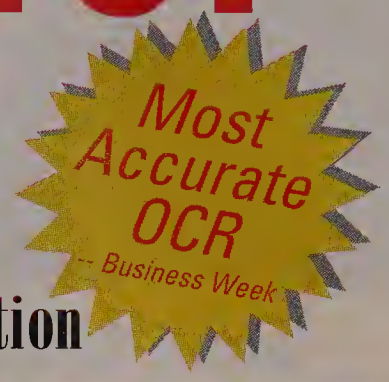

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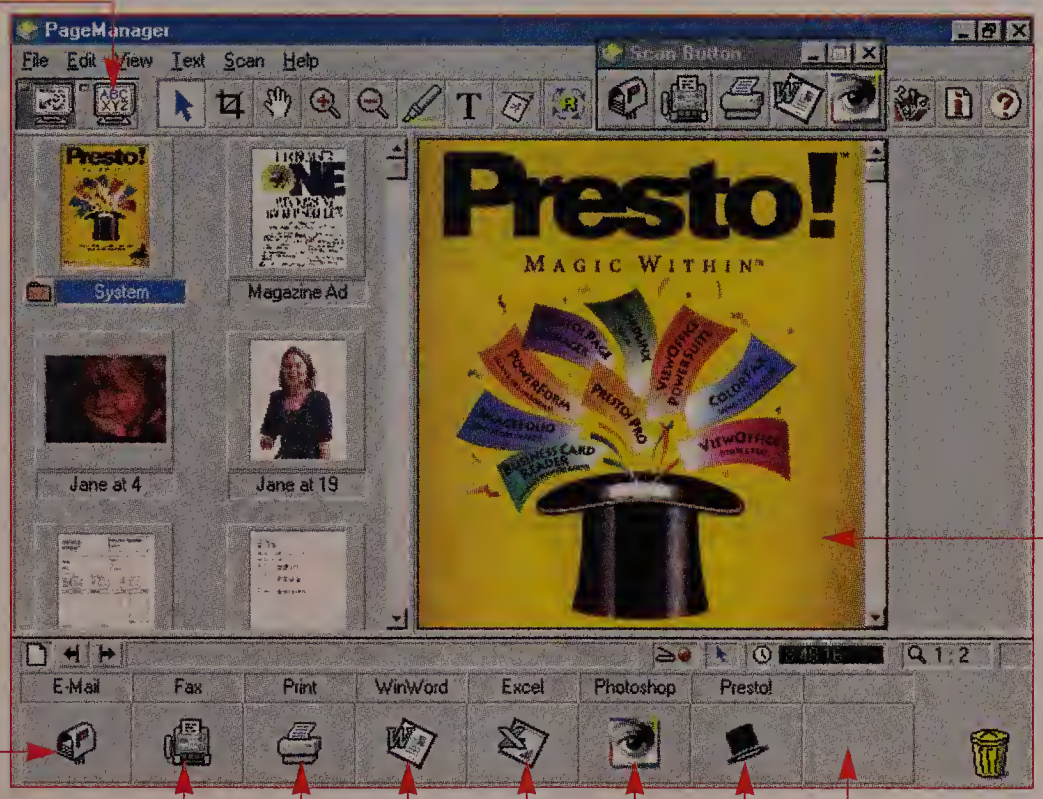

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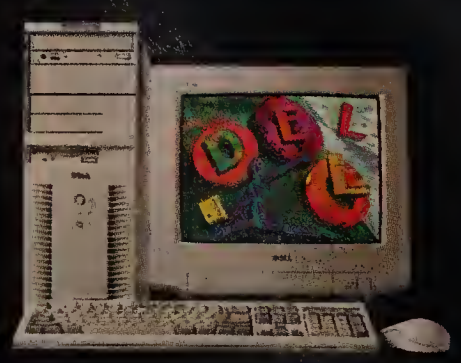

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Dell's featured computer artist is Nance Paternoster of San Francisco, CA.

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Data			•
Phone			•
Total Outlets	7	2	6
Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Typical Runtime in Minutes			
with Pentium 100 w/15" monitor		10	10
Battery backup for			
PC		•	•
Monitor		•	•
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Full-time surge protection for			
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Laser Printer	•		•
Speakers	•		•
Data-line protection for			
Internet or Network			•

Traditionally protecting all your equipment meant buying both a surge suppressor and a UPS. Even then only your AC line was protected. New Back-UPS Office protects all the paths to all your equipment.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your computer's AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive PC.

Only Back-UPS Office provides true common ground protection

Figure 1

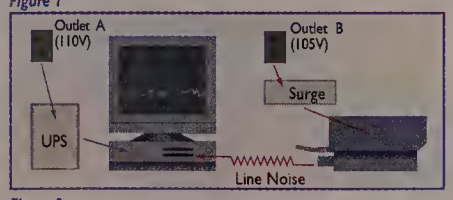

Figure 2

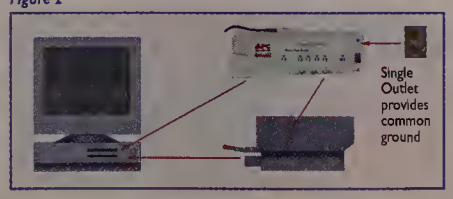

Figure 1: voltage differentials between multiple outlets create line noise and data glitches.
Figure 2: Back-UPS Office's common ground design eliminates the danger of voltage differentials.

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Intranets Make Sharing Information Easy

Until recently, few businesses recognized the World Wide Web's huge potential as an internal communications vehicle. But now corporate *intranets*—private, secure databases that employees can access using their Web browsers—are rapidly becoming as vital as e-mail for disseminating company information to far-flung employees.

This month Rich Brandwein, a technical staff member in the Network Systems Group of Lucent Technologies in Holmdel, New Jersey, tells how Lucent's employees now tap into a nationwide corporate intranet that provides information quickly. —*Editor*

The Beauty of Browsers

Today it seems that a Web site is as common as a business card for companies that want to communicate with customers, prospects, or people who are just curious. But more and more firms are also developing corporate intranets for internal communications among employees.

Intranets allow employees to post documents or other data to a database residing on a company server. The front end of the database looks like a standard Web page, so employees can use Netscape Navigator, Microsoft Internet Explorer, or any other Web browser to view the data and call up or post information to the site. Most employees already know how to use a Web browser, and it's an easy learning curve for those who don't. This saves significant money and time because most workers don't need to learn an additional program.

The MIS department also likes this technology because the server does most of the processing work, and network traffic is reduced. And because the intranet is protected from the outside world by a moat of hardware and software fire walls, it's secure from hackers.

My employer, Lucent Technologies, formerly part of AT&T, has an enormous need for effective internal communications. With over 300,000 employees throughout the United States and around the world, distributing information effectively in a decentralized company of this size is already tough; disseminating critical news in a timely fashion is even more difficult.

For the past several years, most AT&T employees relied on e-mail and voice mail to share information. But it's easy for us to be overwhelmed by e-mail and voice-mail messages: By the time we respond to all those messages, half the day could be over.

There also wasn't a way for us to easily tap into existing information. If, for example, an employee wanted to read one of the 5000 company technical papers published annually, the employee would have to either locate a hard copy or know where an electronic copy resides on a server and how to download it.

Welcome to the Web

Over the years, AT&T has invested heavily in other document sharing and communications technologies, such as Lotus Notes. While Notes lets us share documents, it can be expensive. So we began looking for alternatives. Just a few years ago, when the World Wide Web first began getting attention, it became clear that it would revolutionize the way people access, work with, and distribute information. Web browsers let employees easily navigate through documents, search for information, and even see and hear the CEO's latest speech.

Rich Brandwein of Lucent Technologies: "Intranets can revolutionize company communications."

To build our intranet, we installed Netscape's FastTrack server and SuiteSpot, a collection of Netscape server programs, on our Windows NT and UNIX systems.

Using the Netscape programs, we developed our Web applications based on Sun's Java and JavaScript programming languages. The development tools made it easy for us to link the Web interface to existing relational databases from which we drew the content, and to enable communications over our internal networks. The Netscape Proxy server, part of SuiteSpot, let us control access, security, and network traffic. All in all, we purchased 30 FastTrack, 60 Enterprise, and 20 Proxy servers for the company nationwide.

Once we built the site architecture, we began to link existing database ap-

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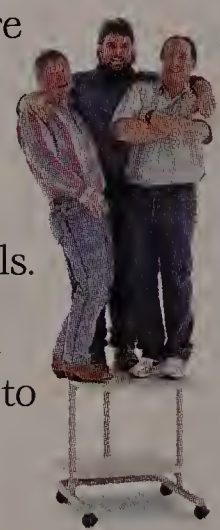

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plications into a new Web-inspired intranet. One of the first intranet services we created exploits our internal database of telephone numbers. Now employees can find each other through a drill-down organization chart that identifies AT&T personnel. We also created a Web interface to an online library where users locate and borrow books and reference materials or find internal documents such as technical papers and reports.

Cut Costs, Raise Productivity

Our intranet allows us to eliminate the wasteful bureaucracy and expense associated with day-to-day clerical tasks. For example, we've created a way for employees to order supplies—everything from furniture and PCs to disks, paper, and pens—right from their computers. They can look at an office supply catalog, fill out an order form online, and have supplies automatically shipped.

It's now possible to simplify transactions between business units, to contract services, and to charge each other for expenses. If someone in Sales wants to have a brochure printed, for example, they must pay Publishing for that brochure from the Sales departmental budget. Work is under way to enable employees to buy "digital cash"—now a reality on the Internet—from their existing billing system and use an intranet universal transaction system.

Of course, AT&T, Lucent Technologies, and other companies have only begun tapping the potential of intranets. The beauty of the Web is that it makes it so much easier to access information no matter where it resides in the company. When Web technology is used for internal communications, any organization—no matter what size—can make business more efficient and more interesting at the same time.

- **Netscape Communications;** 415/937-2555
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Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 14 for contact information.*

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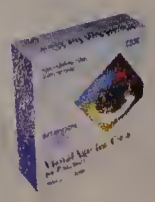

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Windows 95: Happy Birthday?

August 24, 1995: "Start me up!" Magazine covers! Late-night frenzies at computer stores! William Henry Gates III, straight man to Jay Leno!

August 24, 1996: Happy birthday, Win 95. Now, can I get back to work?

Nothing, of course, could possibly have lived up to the prerelease hype. But now that a year's gone by, let's ask the relevant questions: Are we happier? Healthier? More productive? Rocking? Rolling? I don't think so.

Which is not to say I hate the thing. I use Windows 95 on desktop and laptop alike, and though it's full of little gotchas, the new interface is a definite improvement. Background communications work well enough that you can actually do something else at the same time. Programs don't crash nearly as often, and when they do, they don't necessarily crash the system. I never run out of memory or resources.

Installing software is easy. With hardware like the latest Hewlett-Packard printers, you hook things up, turn on your computer, and hand the system a disk when it announces it doesn't recognize the new device.

Swipe and Hype

So why, after a year, does Windows 95 feel like little more than a minor improvement—a decent upgrade certainly, but too little, too late? Much of the problem is definitely Microsoft's fault. Too many promises ended up undelivered, too many loose ends wound up in the finished product, and fixes have been slow in coming.

The built-in backup utility, for example, is basically useless unless you use floppies—not exactly the backup medium of choice when you have more than a gigabyte of data. And since the ancient DOS cluster scheme never got fixed (maybe next time), most of those gigabyte drives waste a lot of their capacity in unnecessary overhead.

It's a rule in the computer world that "nothing" (like a blank character) is something, but Windows 95 won't let you assign an application to files whose names lack extensions. Perhaps a subtle tweak to the Registry might set things right, but who knows? That's undocumented territory, wild country, fraught with peril.

Broken promises? While you load an application, you typically can't do anything else but twiddle your thumbs. Is that really the way multitasking is supposed to work? At one time Microsoft was touting the huge, clumsy Exchange client as "the universal inbox." Now it's "what you're stuck with if you use The Microsoft Network." MSN's sheer emptiness would be worth a column of its own if it were not undergoing a major metamorphosis right now.

And after all the noise about all the usability studies that went into the user interface, guess what? It's soon going to look suspiciously like a World Wide Web browser. Microsoft lately has been calling its strategy "embrace and extend." Given the company's history of appropriation (as in the user interfaces of CP/M, the Macintosh, and now Mosaic), a more accurate phrase would be "swipe and hype."

The Other Culprits

But Microsoft doesn't deserve all the blame. The rest of the industry is also at fault. Given Windows 95's backward compatibility and the huge installed base of Win 3.1 PCs, many developers can't seem to figure out why they should bother doing a special version for the new operating system. Three words, developers: *long file names!*

I still can't use long file names dependably, because it's not worth the bother if even a few of the programs I regularly use can't read or write them. The worst offenders? Online service providers. As I write, neither CompuServe nor America Online has bothered to update its software for Win 95.

At bottom, Windows 95 is mostly a new label on bottles of stale old DOS-and-Windows wine, and it has not aged well.

The hardware business is also at fault. While some vendors are delivering Plug and Play hardware, plenty of others are still dealing cards that Win 95 can't reconfigure. It may not matter anyway: A dirty little industry secret is that many PCs are fresh out of free interrupt lines (IRQs), which hardware devices use to get the microprocessor's undivided attention. The result is that empty slots in these machines may be all but unusable.

But the biggest reason Windows 95 seems tired is that at bottom it's mostly a new label on bottles of stale old DOS-and-Windows wine, and it hasn't aged well. Maybe behind the rumblings of all those Internet start-me-ups is a sense that, after all these years, we really deserve better.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*

By Stephen Manes

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Web of Confusion

Edited by Randy Ross and Russell Glitman

Making Sense of the Plug-In Frenzy

Visit almost any Web site, and you'll be invited to download one or more plug-ins that let you experience audio, video, animation, and special effects. That's the beauty of Internet browsers like Netscape Navigator and (now) Microsoft Internet Explorer. You simply download a compatible plug-in or add-on, and your browser gains exciting new talents and capabilities. But this power can also be a curse. The wild proliferation of plug-ins, which install into Navigator much the way applications install into your operating system, can jam your hard disk and lead to conflicts among add-on apps.

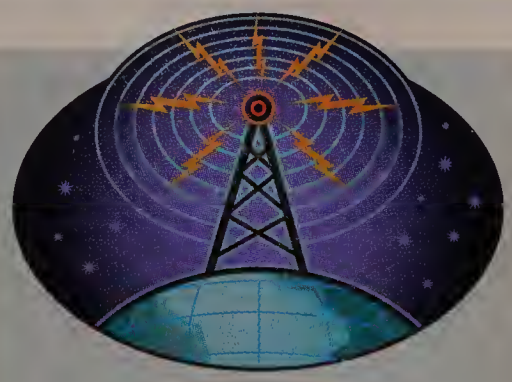
For instance, the site for the film *Mission: Impossible* (http://www.mission.apple.com) requires QuickTime VR, RealAudio 2.0, and Shockwave plug-ins. While RealAudio and QuickTime are small, the compressed Shockwave files consume 2.4MB of disk space before installation. Worse, when we followed the links to download these plug-ins, we found no information on how large the downloads would be. You're left to watch and wait, and reckon the connect-time costs only after the fact.

The browser add-on arena is just heating up. In May the first beta of Microsoft's Internet Explorer 3.0 introduced Internet Explorer add-ons, called ActiveX controls, or applets. A slimmed-down version of Microsoft's OLE technology, ActiveX provides benefits similar to those of Navigator plug-ins, extending Internet Explorer's capabilities beyond viewing and navigating HTML pages. Microsoft and Netscape have also announced compatibility for each other's add-ons—meaning ActiveX controls will work with Navigator and plug-ins will work with Internet Explorer. You can download the ActiveX-compatibility plug-in for Navigator from NCompass Labs' Web site (http://www.ncompasslabs.com).

As if that's not confusing enough, both browsers now support Java, Sun Microsystems' wildly popular programming language. Java enjoys one overriding advantage—programs written in it run on virtually any platform, whether it's Windows, Mac, or UNIX. In addition, Java applets can execute without being permanently downloaded to your PC, so once you're done working with a Java spreadsheet or presentation, for example, the application code removes itself from your system. Many Web sites include animated logos and icons created with Java. The Daily News ticker on PC World Online's home page (http://www.pcworld.com) is an example of such an applet.

Netscape introduced Java support with Navigator 2.0 and recently upped the ante in version 3.0 with LiveConnect, a technology that lets Java applets and Navigator plug-ins trigger each other within a document. A Web page with embedded LiveConnect triggers could play video and audio files simultaneously. With Microsoft having added support for Java in Internet Explorer 3.0, we can expect a tsunami of Java applications in the coming months.

The good news is that if the technology works as promised, you can use either browser to access all the features of any Web page. But the flood of plug-ins, controls, and Java applets can swamp hard drives and confound users who make frequent downloads.



Breaking News

PACKARD BELL AND NEC MERGE: The two companies will combine their PC businesses outside of Japan and China into an $8 billion PC powerhouse to be called Packard Bell NEC. The merger, expected to be completed in July, will yield the world's fourth-largest PC maker. Analysts had mixed reactions to the announcement. The upside: Packard Bell gets sorely needed capital, and NEC benefits from economies of scale in production, which could lead to lower prices. The downside: Past attempts at creating economies of scale between the two firms have not materialized. And the Packard Bell name could be a hindrance. "I don't think having the affiliation with the Packard Bell brand in the corporate market does anything," says Bruce Stephen, vice president of worldwide PC research at International Data Corporation. —IDG News

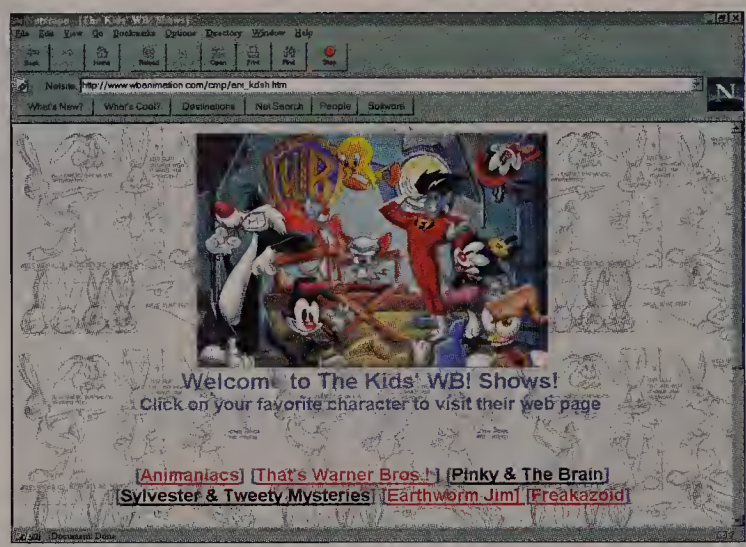
INTERNET APPLIANCES COMING: Computer companies are rushing to bring out low-cost, easy-to-use Internet devices. Products range from bare-bones "Net PCs," such as Acer's $500 AcerBasic system, to Network Computers, which comply with an Internet appliance specification. The NC is intended to be no bigger than a cable TV set-top box, with a simple operating system, a modest amount of RAM, and little or no local storage. Data storage and applications reside on the network. Because an NC can

(continued on page 47)

LEFT: HEIDI MERSCHER; ABOVE: JEFFREY PELO

One-Trick Plug-Ins

Tim Hickman, technical evangelist for client integration at Netscape, said in June that there were about 65 publicly available Navigator plug-ins, with over 70 in development. Many of these plug-ins let Navigator display or play back files produced by desktop applications. One popular category is online presentations: Plug-ins for Microsoft PowerPoint, Gold Disk Astound, and Software Publishing Corporation's ASAP WebShow make it possible for users to view and interact with presentations posted on the Web. The Shockwave plug-in lets you view Web-based multimedia applications created in Macromedia Director, while Asymetrix makes a plug-in that lets you interact with projects created using its ToolBook II multimedia authoring package.



I TAWT I TAW A PUDDY TAT. You'll need RealAudio and QuickTime to get the most out of the Warner Brothers site.

The problem is, many plug-ins provide similar functionality but don't work with other file formats. And you can't import file formats the way you can with a word processor or a spreadsheet. The Gold Disk Astound Web Player plug-in will not import a PowerPoint presentation—the only way to see the presentation is to use the PowerPoint-specific plug-in. Conceivably there could be a separate plug-in for every file format. "That," says Ross Rubin, senior analyst for consulting firm Jupiter Communications, "would be an awful situation to contemplate."

These add-ons deliver everything from multimedia playback to videoconferencing. RealAudio and CoolFusion bring Web-based sound and video, respectively, to the PC. Both of these plug-ins employ a technique called streaming to play media files even as they download. Vdonet's VdoPhone is a helper application that provides Web-based videoconferencing. There's even an add-on, Formula One/Net (at http://www.visualcomp.com/f1net/download.htm), that lets you work directly on Excel spreadsheets posted on the Web.

Stuart Edamura, a graphics technology analyst at Chevron in San Francisco, sees Navigator plug-ins as both an asset and a liability. As a designer of Web pages for Chevron's intranet, Edamura relies on plug-ins—particularly Adobe Acrobat—to let corporate users view data and layouts. Unfortunately, he sees a problem with plug-ins that are downloaded, used once, and put aside.

"I'm very concerned that we are creating lost time," says Edamura.

Where to Find the Best Plug-Ins

PLUG-IN	VENDOR	URL	FEATURES
ABC QuickSilver	Micrografx	http://www.micrografx.com/quicksilver.html	view and manipulate vector graphics
Action	Open2U	http://www.open2u.com/action/action.html	MPEG movie playback
ActiveX	NCompass Labs	http://www.ncompasslabs.com	lets Navigator work with ActiveX controls
ASAP WebShow	Software Publishing Corp.	http://www.spco.com/asap	presentation viewer for ASAP only
CyberSpell 2.0	Inso Corp.	http://www.inso.com	e-mail spelling checker for Navigator
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PowerPoint 32-bit Viewer	Microsoft	http://www.microsoft.com/mspowerpoint/internet/viewer/default.htm	view PowerPoint presentations
QuickTime VR	Apple	http://quicktime.apple.com/qt/sw/sw.html	virtual reality viewer for the Web
RealAudio 2.0	Progressive Networks	http://www.realaudio.com/	audio downloads
Shockwave for Director/Freehand/Authorware	Macromedia	http://www.macromedia.com	multimedia player based on Director
VdoPhone	Vdonet	http://www.vdonet.com	streams live video and voice
WebXpresso	DataViews	http://www.dvcorp.com/webxpresso/download.html	view and manipulate 3-D images
Zip-It	Vertisoft	http://www.vertisoftsys.com	view compressed .zip files on FTP sites

HEIDI MERSCHER

Dealing With Plug-Ins

If you use Navigator 2.0, you can identify the file types, or MIME types, that your plug-ins handle. In Navigator, click on *Help • About Plug-ins* to view a display of MIME types. You can also type about:plugins in the URL line to get the same list.

Another way to take stock is to look in the Plugins folder of your Navigator directory and pick through the DLL files you see there, since all plug-ins use one or more DLLs in this directory. Sometimes you can glean plug-in functions from the last six letters in the file name before the dot. (Note that the first two letters are always reserved for the letters *NP*, designating a Navigator plug-in.) The file date information might also help you ferret out plug-ins that need to be upgraded or disposed of.

Get the latest word on Navigator plug-ins from the BrowserWatch Web site (http://www.browserwatch.com/plug-in.shtml). This index of plug-ins includes brief descriptions and links for downloads.

"Most plug-ins that I'm seeing are niche applications."

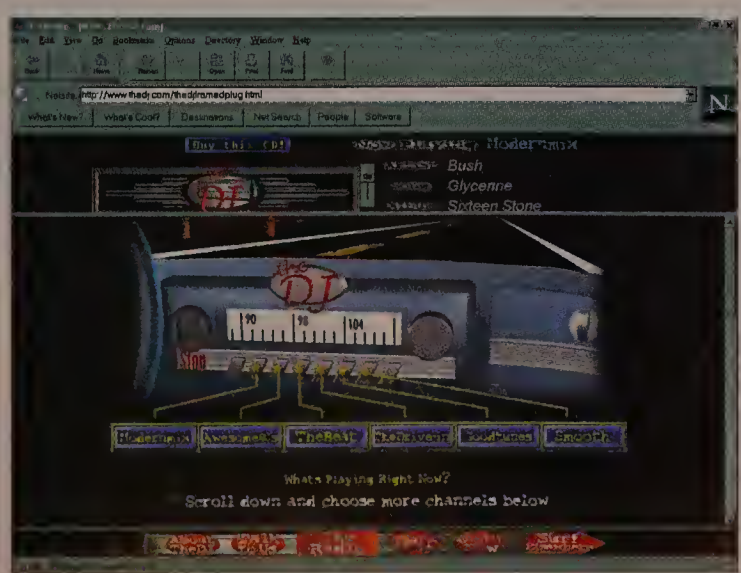
For individual users, this problem plays out on a smaller scale. Even at 28.8 kbps, a 2MB plug-in can take half an hour to download—provided that the user can access the linked FTP site and the transfer doesn't get interrupted along the way. Once installed, the modules can consume more than 3MB of hard disk space. That's an awful lot to ask just to view a single animated sequence, presentation, or video file. Likewise, Internet Explorer's ActiveX model will have users downloading dedicated controls to gain all sorts of features, file formats, and browsing opportunities. And with both of the major browsers supporting each other's add-ons, users may find themselves facing a mélange of plug-ins, ActiveX controls, and Java applets.

One solution is for browser vendors to bundle the most widely used and compelling add-ons with the browser itself. Internet Explorer 3.0 comes with ActiveX versions of popular plug-ins such as RealAudio and Shockwave, as well as the NetMeeting conferencing capability. Navigator 3.0 integrates support for audio, video, and even Internet phone. The package also includes Live3D, a viewer that lets Navigator users browse 3-D environments using the standard Virtual Reality Modeling Language.

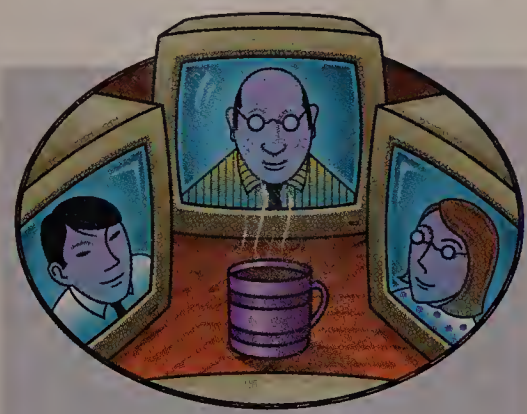
Unruly House

"In a word, it's a mess," says Jupiter's Rubin of plug-in management in Navigator 2.0. "I'm sure that the plug-in architecture succeeded far beyond Netscape's wildest dreams."

Netscape launched a thriving cottage industry by making Navigator plug-ins easy to create, but the company failed to establish strict rules of conduct. There are no tools to manage, track, and uninstall plug-ins, so you have no reliable way to tell what plug-ins you have or what versions are installed. Furthermore, installing a new plug-in can disable plug-ins and helper applications already assigned to work with the same file types. For example, a browser might launch the WinZip application to view and extract compressed .zip files online. But download a plug-in that works with .zip files, and it may take over those duties, whether you want it to or not. That may not be a concern when you've downloaded two or three plug-ins, but as the number climbs, these interactions become critical.



THE INTERNET KILLED the radio. Well, not yet, but you can hear an excellent range of tunes at The DJ.



Breaking News

(continued from page 45)

use a TV as a monitor, it's expected to cost less than $500. Corel, NEC, and Wyse plan to develop components for the NC. Akai has announced the $300 Akai Internet Connection, which plugs into a TV, uses a remote control or wireless keyboard, and runs Oracle's PowerBrowser. Meanwhile, Zenith and Sharp are bringing channel and Web surfing together with their upcoming Internet TVs. Some 27-inch models are expected to sell for under $1000. The Zenith unit is due out this fall; Sharp's in 1997. —B. H.

CONFERENCING AND MORE: Most videoconferencing products contain expensive communications and multimedia hardware that can't be used for much else besides conferencing. That's about to change. ELSA is shipping one of the first add-in boards to combine videoconferencing, an ISDN modem, and MPEG-1 video playback. The ELSAvision is expected to have a street price of about $1450. (Buying these features separately would cost between $1500 and $2500.) In addition, Winnov, a Sunnyvale, California, firm, is now shipping a $299 add-in board, the Videum, that combines video and audio features. The product offers full-duplex sound and captures still images, video, and audio to your hard disk. (All image and video features require a camera, which is not included in this price.) —R. R., S. R.

(continued on page 49)

Netscape's Hickman says Navigator 3.0 addresses some of these problems by providing a control panel that displays the installed plug-ins and the functions they provide. But Raine Bergstrom, ToolBook II product line manager at Asymetrix, says Microsoft has promised more, including an application, the ActiveX Control Pad, that displays installed ActiveX controls and shows when they were last used. An uninstall routine is included in this package.

Yes, there's even a plug-in to help install plug-ins: 20/20 Software's Net-Install promises to streamline plug-in setup, automatically downloading, decompressing, and setting up these files. It even provides an uninstall feature. However, this works only if vendors use Net-Install to build their installation routines. Net-Install is available at http://www.twenty.com.

While you may feel overwhelmed by plug-ins, the situation should improve. "Photoshop had initial growing pains with plug-ins, too," says Jupiter's Rubin, comparing the current browser situation with Adobe's popular image editing program. "And I think vendors will get a little smarter about marrying their products to the Internet without requiring a playback plug-in for every bizarre file format in the world." Let's hope so.

—Michael Desmond and Gabrielle Mitchell

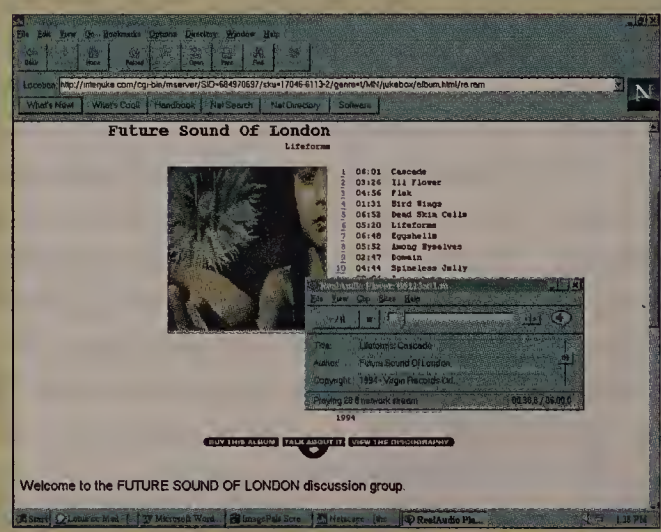
Where to Play With Your Plug-Ins

What can you do with all the plug-ins out there? Actually, lots.

Dozens of sites license Progressive Networks' RealAudio player. One of the best is the Internet Jukebox (http://interjuke.com/jukebox), a listen-and-buy Web site for new music with an emphasis on alternative bands and techno-funk. More straightforward is NetRadio (http://www.netradio.net/), which broadcasts across the Web like a regular radio station. The sound depends on the speed of your online connection and the number of people simultaneously using the service. More ambitious is the *Mission: Impossible* site (http://www.mission.apple.com). The movie's theme music starts automatically, with the RealAudio controls embedded at the bottom of the page. NetRadio, Internet Jukebox, and other sites still spawn a separate RealAudio interface, hogging screen space. For music lovers, http://www.thedj.com is a must—it includes music from every era.

Netscape's Live3D connection shows off the best of Web-based 3-D animation. It allows you to zoom around images, including the cool Duke's Diner (http://www.marketcentral.com/vrml/duke.wrz).

Shockwave games are getting a lot of attention. You can play a few of your own at http://www.dartmouth.edu/~loeb/games.html. Or expose your Shockwave plug-in to a new twist on childhood games at the Tater Man site (http://lark.cc.ukans.edu/~asumner/shock/potato/).

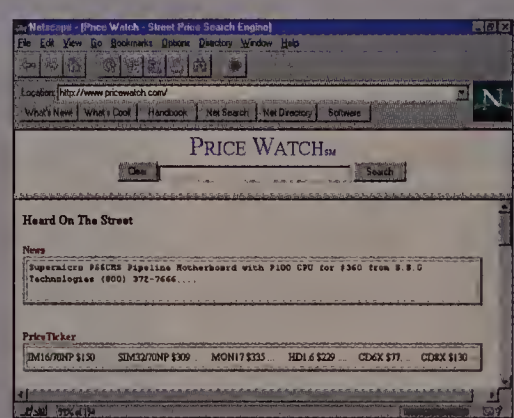


AT THE INTERNET JUKEBOX, listen to tunes and buy the ones you like. Headphones for the office required.

The Web Browser

Bargain Hunting on the Web

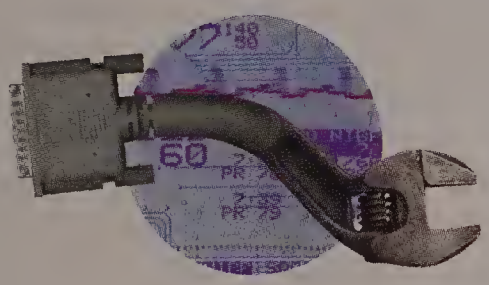
Shopping for PCs in the real world can be a time-consuming and costly undertaking, but on the Web you can find some sweet deals. The Price Watch site (http://www.pricewatch.com) tracks the best street prices of PC components and peripherals available from authorized resellers on the Net. You can search for a particular product or scan the PriceTicker and News board for daily specials...You could pick up a fully loaded PC for a song at the Onsale Online Auction House (http://www.onsale.com). Bids are placed and accepted via e-mail, and you'll be notified if someone else beats your bid...If you're looking for a new hard drive, check out the Corporate System Center Online Store (http://www.corpsys.com). It sells new and refurbished hard drives, controllers, CD-ROM drives, and other PC accessories at wholesale prices...You can also rummage in the Discount Computer Supplies store (http://www.webcom.com/~discount). Here you'll find memory, CPUs, hard disks, modems, sound cards, video boards, CD-ROM drives, motherboards, and more at rock-bottom prices. —Cathy Kenny



LET YOUR MOUSE do the walking. Track down the best street prices of PC hardware and peripherals at Price Watch.

How to Cut Down on Tech Calls

Hope you don't miss the Muzak: Thanks to a new diagnostic program from SystemSoft called SystemWizard, you may soon be making fewer calls to tech support. SystemWizard uses artificial intelligence and a knowledge base to snoop around your computer and detect, diagnose, and fix a variety of hardware and software problems, such as General Protection Faults, multimedia configuration conflicts, printing difficulties, and communications errors, including those involving the Internet. By September vendors will begin bundling SystemWizard with new PCs and add-on items. (It won't be available in stores.) They'll add product-specific information, so SystemWizard will do much more than general diagnostic programs.



PCs with SystemWizard shouldn't cost more than systems without it. That's because vendors bundling the program should be able to pass on the savings gained from reduced tech support costs. The greatest benefit of SystemWizard is its convenience. The program's interface looks like a home office scene in which you click various objects, such as a monitor, to diagnose a problem. When you get an error or General Protection Fault message, SystemWizard pops up and asks if you'd like help. The program looks at information in your computer, such as Windows 95 Registry settings and information from programs.

As you install new products that use SystemWizard, information from them is added to the existing knowledge base. A vendor can also set up a server you can dial into for updates.

While SystemWizard can't fix everything, we were impressed with the beta version. The application handles many problems quickly. For example, it can restore multimedia DLLs removed by new applications, and it knows how finicky Microsoft Word 6.0 is when it comes to making printer connections. But this "wizard" isn't all-knowing—it can't help you with a bug that's not in the knowledge base or explained on a vendor server. Conflicts between products are rampant, and SystemWizard can't keep up with all the problems. For instance, if a graphics program has trouble with a particular printer, the issue may or may not be in the knowledge base. No doubt you'll still have to make some calls to tech support. But SystemWizard is an innovative, helpful program for those of us who hate error messages. Not to mention Muzak.

• **SystemWizard;** SystemSoft; 508/651-0088; http://www.systemsoft.com

Reader service no. 824

—Laurianne McLaughlin

SystemWizard: Not a PC Panacea

WHAT IT CAN DO

Detect configuration problems.

Find hardware and software conflicts and correct them automatically.

Catch known bugs in some programs and offer fixes.

Explain some General Protection Faults and remedy the causes.

Call a vendor server to download new information, fixes, and drivers.

WHAT IT CAN'T DO

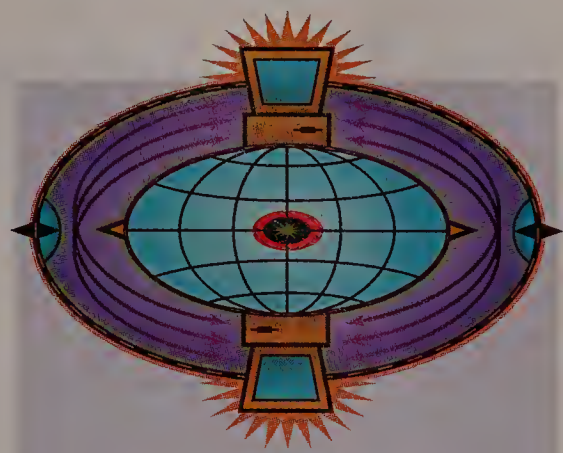
Answer questions about all conflicts between all products.

Identify all vendor-specific hardware problems, such as parts prone to failure.

Explain bugs that aren't covered in the program's database.

Lead you through hardware upgrades.

Run under Windows 3.1.



Breaking News

(continued from page 47)

MASS STORAGE: SyQuest's new EZ-Flyer 230 is a removable-media drive that should stack up well against Iomega's compact 100MB Zip drive. The $299 EZ-Flyer not only has higher capacity (230MB) than the Zip drive, it's also faster (average access time 13.5ms). However, at $199 the Zip drive is cheaper. EZ-Flyer disks cost $29.95 each. —R. F.

TIDBYTES: Cheap Dictation Software: Kurzweil Applied Intelligence has unveiled a shareware voice recognition program, VoicePad 1.0 for Windows 95, that lets you enter text without typing. Downloadable from the firm's Web site (http://www.kurz-ai.com), the program is free for the first 30 days. It costs $49.95 when you sign on as a registered user...Consumer Alert: U.S. Robotics has begun replacing Courier PC Card modems due to a problem with chips overheating. Symptoms of the defective chip include a repeated loss of connection. If you're experiencing problems, call the vendor at 800/231-8770...Internet-Ready LANtastic: By the time you read this, Artisoft should be shipping a Net-ready version of its network operating system. LANtastic 7.0 lets network users share a Net connection and includes Netscape Navigator 2.0, a full TCP/IP stack, and a winsock gateway. The product lets you use a single disk to install across the network. LANtastic costs $499 for ten users.

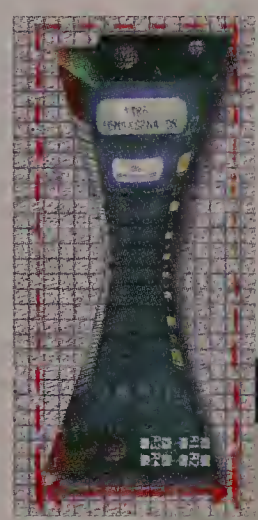
OLD DOMINION UNIV. LIBRARY NORFOLK, VA.

New RAM Enhancers for Win 95 Fall Short

TEST DRIVE

Can a $50 piece of software dramatically boost Windows 95 performance so that you don't have to buy more RAM? Not likely, according to our tests of the latest round of RAM enhancement utilities.

Earlier this year (see *Top of the News*, January) we found that two Win 95 memory managers—Quarterdeck's MagnaRAM 2 and Syncronys Software's SoftRAM95—failed to provide the performance boost you'd get by, say, increasing your RAM from 8MB to 16MB. Moreover, they actually slowed system performance by up to 40 percent.



Recently we examined the latest round of Win 95 RAM utilities. Helix Software's Hurricane 2.0 for Windows 95 and Connectix's Agent 95 have a slew of features, including diagnostic tools and RAM compression schemes that are designed to speed up your system.

The performance-enhancing features of these products left us unimpressed. Windows 95 users seeking faster performance should pop more SIMMs onto their motherboards, not rely on Agent 95's or Hurricane's RAM compression capabilities. Running *PC World*'s WorldBench suite of Windows 95 and Windows 3.1 application benchmarks under Windows 95, a 90-MHz Pentium PC with 8MB of RAM and Agent 95 loaded in memory was actually 4 percent *slower* than the same system without Agent 95. In a second set of tests in which we ran our benchmarks with four applications open in the background, Hurricane turned in its best performance and was 12 percent faster than the same configuration without Hurricane loaded. But this is a far cry from Helix's claim that the product can make an 8MB system perform "almost as well" as a 16MB machine.

The good news is that the diagnostic utilities in both Agent 95 and Hurricane are pretty slick, displaying important information about a PC's memory usage and other key details about performance.

Agent Uncovered

While Connectix markets the $60 Agent 95 more as a performance diagnostic tool, it nevertheless touts the program's Dynamic RAM Compression feature, which the vendor claims reduces the amount of time your PC spends accessing *virtual memory*, a section of hard disk space where Windows 95 stores instructions and data that won't fit in conventional RAM. However, as already noted, Agent 95 actually slowed overall performance on our 8MB test system. The performance hit may be a result of the program's 180K memory footprint, which the company says it plans to reduce in future versions.

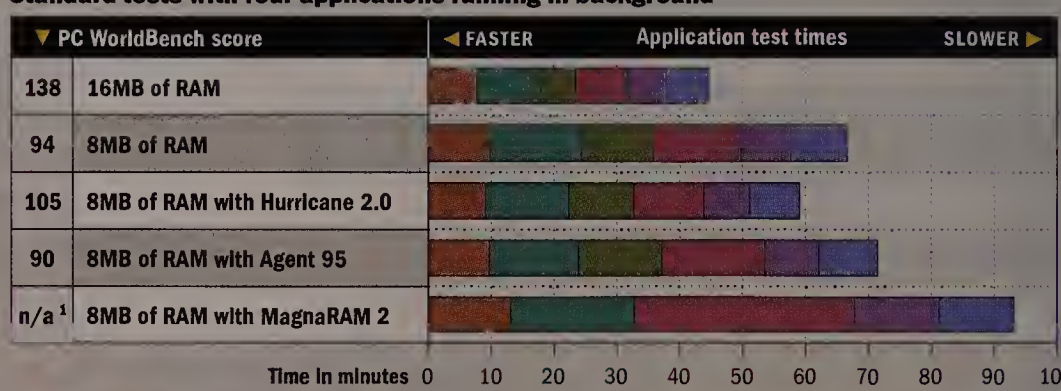
Agent 95 shows greater promise as an early-warning system that detects potential RAM shortages and related problems. One of its best diagnostic tools, Memory Agent, uses a color-coded pie chart to show which applications are currently using the most memory. Below the chart, Memory Agent lists all apps currently loaded in memory and their RAM usage. This tool takes much of the guesswork out of deciding which apps are the memory hogs.

TEST REPORT

RAM Utilities Still Do Little for Performance

Standard PC WorldBench 1.0 tests

Standard tests with four applications running in background



Word 7.0 · Excel 7.0 · Picture Publisher 6.0 · Paradox 5.0 for Windows · WordPerfect 6.1 for Windows · 1-2-3 release 5 for Windows

[1] Not available because system did not complete Picture Publisher test.

Methodology All tests ran on a Micron P90 Millennia with a 90-MHz Pentium CPU, a 256K secondary cache, a Diamond Stealth64 DRAM video card with 2MB of DRAM, and an 850MB hard drive. We loaded each memory utility in its default configuration. For the second set of tests, we ran Norton AntiVirus for Windows 95, Netscape Navigator 2.0, Microsoft Schedule+ 7.0, and Windows Explorer in the background. For a description of the PC WorldBench 1.0 tests, see the Test Report in this month's system review. Higher scores are better.

Data based on PC WorldBench testing conducted by the PC World Test Center. All rights reserved.

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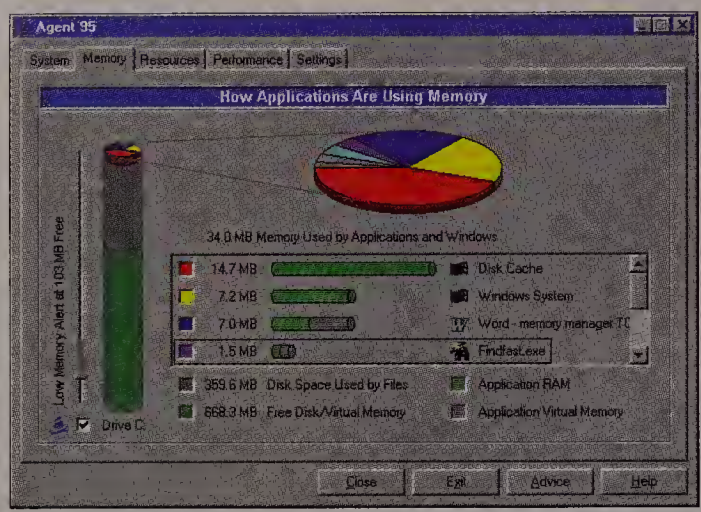
Circle 163 on reader service card



FIND THE MEMORY HOG: Agent 95's Memory Agent uses a pie chart to show which apps use the most RAM.

We also liked Agent 95's ability to suggest solutions to potential system conflicts. For instance, if your system is running low on hard disk space, the Agent 95 icon in Win 95's Taskbar changes from blue to yellow. Then the Memory Agent interface pops up, with clearly written, detailed advice on how to solve the problem.

Unlike a Hurricane

The retail box for Hurricane makes a tantalizing claim: "Can an 8MB system perform almost as well as a 16MB system? You bet!" implying that using this $50 program is almost as effective as doubling your PC's RAM. But our tests show otherwise. While Hurricane provided a 6 percent speed boost to our 8MB system, this performance was also 18 percent slower than the same system with 16MB of RAM.

However, we were able to verify Helix's claim that its RAM compression technology performs better with more applications loaded in memory. In our tests, an 8MB system with four apps open ran 12 percent faster with Hurricane installed. Still, this was about 24 percent slower than running the test with 16MB of RAM.

Helix Software says that our test results are "at the low end of the spectrum" and that Hurricane's performance gains should range from 10 to 50 percent.

Like Agent 95, Hurricane includes a powerful diagnostic utility that reports on your PC's memory usage and hardware setup, plus benchmarks that test key components. Hurricane also includes other features, such as a utility designed to improve printing performance.

More to Come

By the time you read this, the next version of Quarterdeck's MagnaRAM should be shipping. The company claims it will be better than version 2, which performed poorly in our tests. We can't judge the new MagnaRAM, but when it comes to boosting performance, Agent 95 and Hurricane 2.0 promise more than they deliver.

—Jeff Bertolucci

Agent 95

Connectix, 800/950-5880
Street price: $60
Reader service no. 818

Hurricane 2.0 for Windows 95

Helix Software, 800/451-0551
Street price: $50
Reader service no. 819

Bug Watch Trouble With Windows 95's Disk Partitioning

Windows 95's fdisk/MS-DOS Mode Incompatibility

▶ **Bug:** Use Windows 95's fdisk partitioning utility to create one or more extended partitions on an EIDE hard disk, and the contents of those partitions (drives D: and higher) may appear to be replaced by those of drive C:, or may even appear to be corrupted. Worse, any program that attempts to write to the extended partition will corrupt its contents.

The problem occurs only when your EIDE drive is running in Logical Block Addressing mode, which allows DOS or Windows to read drives larger than 528MB, and you restart the computer in MS-DOS mode or launch a DOS program configured to run in MS-DOS mode. The problem is caused by two new partition type values—0E and 0F—that Windows 95's fdisk uses when both the hard drive and the computer's BIOS support LBA mode. Unfortunately, other operating systems, including Windows NT, MS-DOS, and OS/2, as well as third-party disk partitioning tools like PowerQuest's popular PartitionMagic, are unable to read type 0E and 0F partitions, creating the same opportunity for data corruption.

▶ **Work-around:** To avoid this problem, don't select the 'Restart the computer in MS-DOS mode?' option in the Shut Down dialog box, and don't launch programs configured to run in MS-DOS mode. If you need to use a DOS program in MS-DOS mode, shut down the computer, then manually reboot the system using <Ctrl>-<Alt>-<Delete> (or by pressing a reset button or powering it off, then back on). When the message 'Starting Windows 95' appears on screen, press <F8> and select *Command prompt only* from the boot menu. A better but more time-consuming fix is to repartition your hard disk using the command fdisk /x, which prevents the utility from creating type 0E and 0F partitions in the first place. Partitioning destroys all data on the hard disk, so make a complete backup first. If you use PartitionMagic, be sure to download the version 2.03 patch from PowerQuest's Web site (http://www.powerquest.com). This patch allows PartitionMagic to see the new partition types, and even convert them to standard 05 and 06 types. —Scott Spanbauer

Found a hardware or software bug? Post your report on PC World Online or send us e-mail at bugwatch@pcworld.com.

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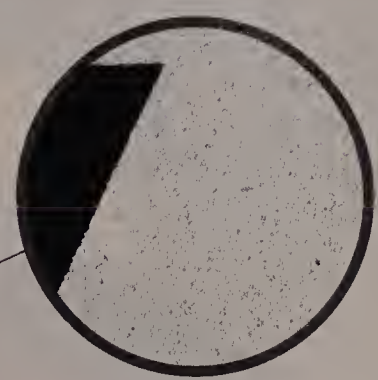
The New 200MHz Dell Dimension XPS Pro200n

$2599

"...THE PENTIUM PRO LEAVES THE PENTIUM IN THE DUST."

–PC Computing, 3/96



magnified 25x

Notice there's no asterisk to qualify that statement.

Dell's featured computer artist is Marco Marinucci of San Francisco, CA.

PC Computing BEST

No ifs, ands, or buts. Just pure, unbridled speed. Period. That's the Dell Dimension XPS Pro200n. The breathtakingly fast machine that prompted *PC Computing* to reach for oxygen as they remarked, "...it's the fastest Intel-based system we've ever seen—hands down." And in comparing the performance of this Pentium Pro to that of the Pentium, they said, "...exceptional—more than double that of the 133MHz Pentium."

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MICROSOFT WINDOWS NT READY-TO-RUN

intel inside PENTIUM®PRO PROCESSOR

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IBM Makes LANs Easier

TEST DRIVE ▶ You probably don't spend much time thinking about your network operating system, but you should. A slow NOS can make you wait endlessly to retrieve e-mail and files. A poorly designed system can also create headaches and expense for network managers. If you're happy with your current NOS, fine. But if you're shopping, you should consider a new product: IBM's OS/2 Warp Server 4, a powerful, easy-to-use system that in many ways surpasses the category leaders, Novell NetWare 4.1 and Microsoft Windows NT Server 3.51.

PREASSEMBLED SOFTWARE: Network manager John Robinson says Warp Server reduces setup and support costs because it has all the "parts and pieces" in one place.

NOS Evolution

At the core of OS/2 Warp Server is IBM's OS/2 LAN Server 4.0, a 32-bit, multitasking, multithreaded NOS that has proven to be a solid and reliable performer. IBM has wrapped OS/2 LAN Server with the OS/2 Warp graphical user interface that we've found makes the NOS easier to install and administer than either NetWare or NT Server. In addition, Warp Server integrates a raft of local area network tools, which NT Server and NetWare administrators must purchase separately.

For some companies this bundling arrangement will make the difference as they decide on a product. After evaluating both Windows NT Server and NetWare, John Robinson, network manager for the South Carolina Department of Parks, Recreation, and Tourism in Columbia, settled on Warp Server because "all the parts and pieces are in there."

Even with all those tools, the product is competitively priced. The $629 basic Warp Server package is designed for about 120 users. It contains extensive management tools, backup and recovery features, remote access capabilities, and high-powered TCP/IP services.

Warp Server Advanced 4 ($1299) is designed for more complex setups. To the basic package, Advanced adds High Performance File System (HPFS), which lets hard drives more easily handle data transfer on large networks. You also get disk mirroring and duplexing.

PACKED TOOL KIT: OS/2 Warp Server includes virtually all the LAN management utilities a system administrator requires.

Both versions support a variety of PC platforms, including DOS, all flavors of Windows, and OS/2. You need to purchase a $49 license for each user. A special package called Warp Server First Step includes a ten-user license and costs $829. Clients for Macintosh or AIX (IBM UNIX) are also available separately.

Getting Up and Running

Installing and configuring a shipping version of Warp Server was a breeze. You can choose an easy basic install or opt for a full custom installation. Warp

A New OS/2:

The next release of IBM's OS/2 Warp, code-named Merlin, is expected to ship by the end of the summer. A prerelease version of the product wasn't available for review at press time, but IBM hasn't been shy about touting its advantages. The most striking new feature will be built-in voice support. IBM is incorporating its VoiceType technology into Merlin's core to provide navigation, which lets your PC respond to spoken commands, and dictation, which you can use to enter text and data into applications such as word processors.

In addition, Merlin will have vastly expanded connectivity features, including remote access that will let you dial in to your computer via a modem and access documents or synchronize files on a laptop or other PC. IBM claims Merlin will be a "universal client" that will allow networked users to connect Merlin-equipped PCs to virtually any network operating system. A new object-oriented Web browser will provide some unique features. For example, you'll be able to keep icons for your favorite Web sites on your Merlin desktop—just click one to connect to that site. But Merlin won't be compatible with 32-bit Windows 95 and NT applications. And with the development of native OS/2 apps dead in the water, Merlin will need some powerful magic indeed to become a rousing success.

KEVIN HORAN

To cruise the Internet, you need the right vehicle.

Today's Internet is a superhighway, taking you to places you've never dreamed of. But to travel it in style, you need the right vehicle. The new 17PX monitor from Hansol. This 17-inch (15.7" viewable) masterpiece features a 0.26mm dot pitch black matrix CRT with anti-static and AR coating, plus 1600 x 1200 ultra-high resolution. For clarity, color, and depth that makes you feel you're looking out a window, not at a screen. While its rapid refresh rate keeps you steady, its advanced menu controls provide 20 on-screen settings to keep you in complete command. It's also fully PC and Mac compatible, with no adapter needed, and comes with a 3-year limited warranty.

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Circle 102 on reader service card

Server is particularly adept at recognizing network hardware—my server was up and running in less than half an hour. Setting up accounts and client resources is simply a matter of dragging and dropping icons and templates and filling in the particulars.

Warp Server does lack a few features, although they apply only to the largest installations. There are no global directory services (like NetWare's NDS) that let managers of big networks use a single PC to set up and maintain their entire LAN. Warp Server also lacks the high-level security features that NT and NetWare incorporate. But both objections will become moot later this year when IBM ships Directory and Security Services for Warp Server.

OS/2 Warp Server 4, Warp Server Advanced 4

IBM Corp., 800/342-6672
http://www.austin.ibm.com/pspinfo/
Pricing (without client licenses): Warp Server $629 (Warp Server First Step special package $829), Warp Server Advanced $1299

NOS Ahead

Both Novell and Microsoft plan to ship upgrades this year. Novell's next version of NetWare, due in the fall, is expected to include features presently available only in Warp Server. Windows NT Server 4.0, expected to ship by the end of the summer, also will offer additional tools.

—Stan Miastkowski

LAN Operating System Overview

The three major contenders in the network operating system market are serious packages for serious use in a wide range of LAN environments. In a competitive market, they share numerous common features, such as extensive client support, integrated printing and backup facilities, and basic security. There are, however, key differences in what they include. ● = Yes ○ = No

	IBM OS/2 Warp Server 4	Microsoft Windows NT Server 3.51	Novell NetWare 4.1
List price			
10 clients and server	$829	$999	$2495
100 clients and server	$5217	$3299	$6995
File and print features			
Global directory services	○[1]	●	●
Supported file systems	FAT, HPFS[2], NTFS	FAT, HPFS, NTFS	NTFS
Peer-to-peer support	●	○	○
Client printer support[3]	●	○	○
LAN administration			
Management tools	extensive	limited	limited
Software distribution/ license control	●	○	○
Remote client control[4]	●	○	○
Other notable features			
SMP support	○[1]	●	○[1]
Integrated remote access	●	●	○

[1] Available later this year. [2] Warp Server Advanced only. [3] Allows printers on any PC to be used as network resource. [4] Allows system administrators to control any PC on network remotely.

Nexar PC Has Simple but Limited Upgrades

TEST DRIVE

Every PC buyer fears system obsolescence. At first glance, start-up Nexar seems to offer a cure for techno-senescence with what it claims is the ultimate upgradable PC. Not quite. While this unique Pentium minitower offers a removable hard disk that locks in place and easy access to RAM, secondary cache, and processor slots, it's already been surpassed by some of the latest innovations. For instance, the Nexar accepts only Pentium-level chips (including AMD and Cyrix CPUs) and EDO RAM, at a time when systems using Pentium Pro chips and alternative memory types such as SDRAM offer the latest performance edge. Also, the Nexar's easy-access design can be a mixed blessing for people who manage large fleets of PCs. They can swap silicon much faster than with conventional PCs, but the thin plastic cover, while lockable, leaves the expensive, untraceable chips more open to theft.

Upgrade issues aside, the Nexar is a performance contender. The Pentium-166 machine we tested kept pace with its peers, and a high-end multimedia P-166 system with 16MB of RAM, a 15-inch monitor, a 1.2GB hard disk, and a 28.8-kbps modem is competitively priced at $2500. For an in-depth analysis, look for the Nexar in October's system review. —Bryan Hastings

JOHN GREENLEIGH

• **Nexar** street price $2500; Nexar Technologies Inc.; 888/639-2772, 508/836-8700; http://www.nexr.com
Reader service no. 820

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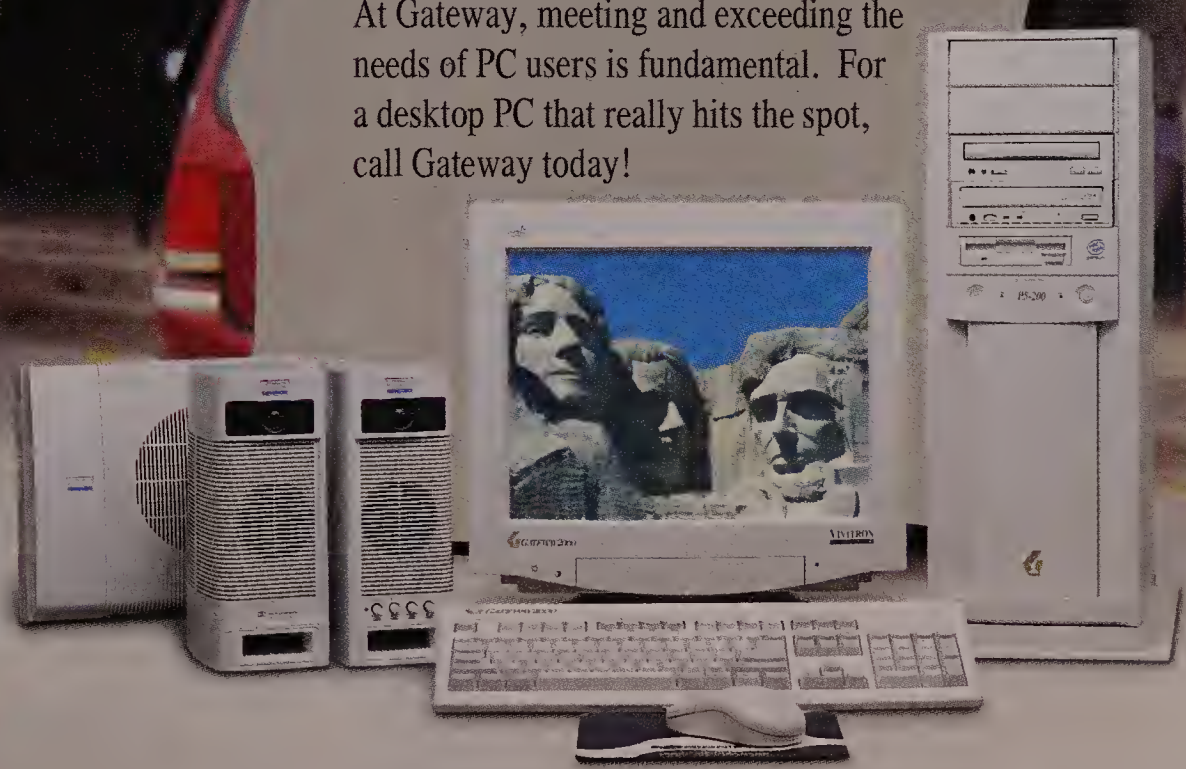
P5-200XL

Ahhh! There's nothing like quenching your thirst for power and creativity with one stellar PC. That's why we took the fastest Pentium® processor available and combined it with refreshing new technology like a CD-recordable drive and 32MB synchronous DRAM to produce our new P5-200XL. You get lightning-fast performance, plus all the tools you need to create your own CDs. At Gateway, meeting and exceeding the needs of PC users is fundamental. For a desktop PC that really hits the spot, call Gateway today!



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Gateway Solo 2100 Portable PCs

Relax. The freedom of the new Gateway Solo™ 2100 multimedia notebook is yours. Based on the road-tested features of the Gateway Solo portable PC, Solo 2100 notebooks deliver all the features you want *and* need. Bigger screens, an all Pentium® processor-based lineup, 6X CD-ROM drives and 16MB EDO RAM standard — for less. They start at $2,699. And because we know you're accustomed to free rein, all Gateway Solo 2100 multimedia notebooks are custom-built to your specifications. We've blazed new trails in portable computing — now you can too. Road warriors, call Gateway today!

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February 1988
The bovine species makes its debut in PC advertisements with Gateway's first national ad. Cows become cool.
July 1990
The stakes are raised in PC advertising. Gateway pioneers theme ads and easy-to-read bullet-point configurations with the "PC Saloon" ad.
April 1991
Gateway starts shipping PCs in cow-spotted boxes. Cow-spot fever spreads across the nation.
February 1992
PCs with the "works" become the standard, as Gateway offers choice of application software on new systems at no extra charge.

Quality That's EASY To Spot!

Gateway 2000 has been taking the guesswork out of buying PCs ever since our humble beginning in 1985. We give you all the information you need to find the right system. And great prices, quality products and outstanding service and support are the norm rather than the exception. We've also made your PC buying experience more fun by embracing our origins — Gateway was started by a couple farm boys in a barn on a Midwestern cattle ranch. In honor of these roots, 5,000 GATEWAY™ employees painted cow spots on our headquarters. No polished silver or mirrored glass here. That's not Gateway's style. After all, we *were* born in a barn.

Destination Big Screen PC

It's easy to spot the big trends with Gateway. Now after 11 years of rolling out some of the hottest trends around, we started a trend that will change the way you look at computers — forever. It's the Destination™ Big Screen PC. We've merged the features of a multimedia PC with the impact of a big screen TV to create a whole new computer category. The 31-inch monitor, wireless keyboard and Field Mouse™ remote control harness the power of a Pentium® processor to give you the ultimate multimedia PC. Computing just moved to the family room. Pull up a couch. For the big picture, call Gateway today!

July 1994
The multimedia bonanza begins – CD-ROM drives become standard on all Gateway desktop systems.

intel inside
pentium

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Multimedia Systems

P5-120 FAMILY PC™

- Intel® 120MHz Pentium® Processor
- 16MB EDO DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64-Bit PCI Graphics
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit GATEWAY™ Sound Card
- Altec™ Lansing ACS-40 Speakers
- TelePath® 28.8 Fax/Modem
- CrystalScan®15 .28dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- Microsoft® Windows® 95
- Generations II Software Collection

$1799

P5-166 FAMILY PC

- Intel 166MHz Pentium Processor
- 16MB EDO DRAM
- 256K Pipelined Burst Cache
- 2.5GB 11ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers
- TelePath 28.8 Fax/Modem
- Vivitron™17 .26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations II Software Collection

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- 512K Pipelined Burst Cache
- 2.5GB 11ms EIDE Hard Drive
- Matrox® 2MB WRAM PCI Graphics
- ▶ CD-Recordable w/ SCSI Controller
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Gateway Sound Card
- Altec ACS-400 ACS 250 Speakers
- TelePath 28.8 Fax/Modem
- Vivitron17 .26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*
- Generations II Software Collection
- Gateway Gold™ Premium Service

$3999

DESTINATION™ SYSTEM

- All systems match corresponding multimedia system configurations listed, excluding speakers, with Destination Big Screen PC upgrade (see details on next page) replacing standard corresponding components and software.

- *D5-120* **$3499**
- *D5-166* **$3999**
- *D5-200* **$5099**

Professional Systems

P5-100

- Intel 100MHz Pentium Processor
- 16MB EDO DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64-Bit PCI Graphics
- 8X CD-ROM/3.5" Diskette Drives
- Vivitron15 .26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

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P5-133

- Intel 133MHz Pentium Processor
- 16MB EDO DRAM
- 256K Pipelined Burst Cache
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- 2MB MDRAM, 128-Bit PCI Graphics
- 8X CD-ROM/3.5" Diskette Drives
- Vivitron15 .26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
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- MS Windows 95
- MS Office 95, Professional Edition*

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P5-166

- Intel 166MHz Pentium Processor
- ▶ 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- 2.5GB 11ms EIDE Hard Drive
- 2MB MDRAM, 128-Bit PCI Graphics
- 8X CD-ROM/3.5" Diskette Drives
- Vivitron17 .26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

$2699 Business Lease† $99/mo.

G6-180

- Intel 180MHz Pentium Pro Processor
- 16MB EDO DRAM
- 2.5GB 11ms EIDE Hard Drive
- 2MB MDRAM, 128-Bit Graphics
- 8X CD-ROM/3.5" Diskette Drives
- Vivitron15 .26dp Monitor (13.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows NT® Workstation 3.51 or MS Windows 95
- MS Office 95, Professional Edition*

$2499 Business Lease† $92/mo.

Professional Systems

G6-200

- Intel 200MHz Pentium Pro Processor
- 32MB EDO DRAM
- 2GB 9ms Fast SCSI Hard Drive
- Matrox 4MB WRAM PCI Graphics
- 4X SCSI CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron17 .26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows NT Workstation 3.51 or MS Windows 95
- MS Office 95, Professional Edition*

$3699 Business Lease† $136/mo.

The D5-200 PC has not been approved by the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.

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S5-100

- 11.3" DSTN SVGA Color Display
- Intel 100MHz Pentium Processor
- 16MB EDO DRAM expandable to 40MB
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- 540MB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Works 95

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S5-133

- 12.1" Active Matrix SVGA Color Disp
- Intel 133MHz Pentium Processor
- 40MB EDO DRAM
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- 1.2GB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
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- **Sound Card:** 16-Bit Hi-Fi Wavetable Audio Card
- **Monitor:** Destination 31" VGA Monitor
- **Case:** 7-Bay Charcoal-Colored PC Case
- **Keyboard:** Wireless Keyboard with Integrated EZ Pad™ Pointing Device
- **Mouse:** Field Mouse™ Remote with Integrated Trackball
- **Software:** Destination Software Collection
  (Call about this package of software specially selected for the Destination Big Screen PC's extraordinary multimedia capabilities.)
- **Speakers:** Not included. The Destination Big Screen PC has been designed for easy integration with your existing stereo system. Need a high-quality sound system? See speaker option at right.

Option

- **harman/kardon High-Fidelity Sound System**

Seven-piece Dolby® Surround Sound Pro Logic speaker system including AVR-10 audio/video receiver with remote, subwoofer, center channel, and four satellites for the ultimate multimedia audio experience. **$699**

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Includes Quicken® Deluxe 5, Quicken Financial Planner,™ Quicken Family Lawyer,™ and Quicken Parents' Guide To Money.™ **$69**

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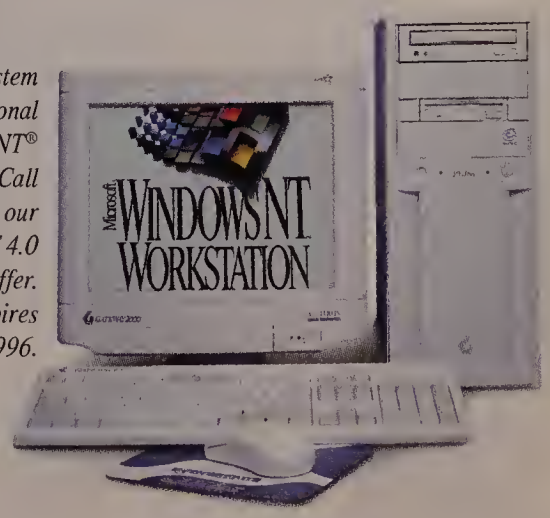

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S5-133 ■ 12.1" SVGA Active Matrix Color Display ■ Intel® 133MHz Pentium® Processor ■ 40MB EDO RAM ■ 256K Pipelined Burst Cache ■ 1MB EDO Video RAM ■ 1.2GB Removable Hard Drive ■ Modular 3.5" Floppy Drive ■ Modular 6X CD-ROM ■ 16-Bit Sound with Speakers ■ 28.8 PCMCIA Fax/Modem ■ Two Lithium Ion Batteries ■ Carrying Case ■ Microsoft® Windows® 95 ■ MS Office 95, Professional Edition ■ **$5449** Business Lease* $195/mo.

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LASERJET PRINTERS

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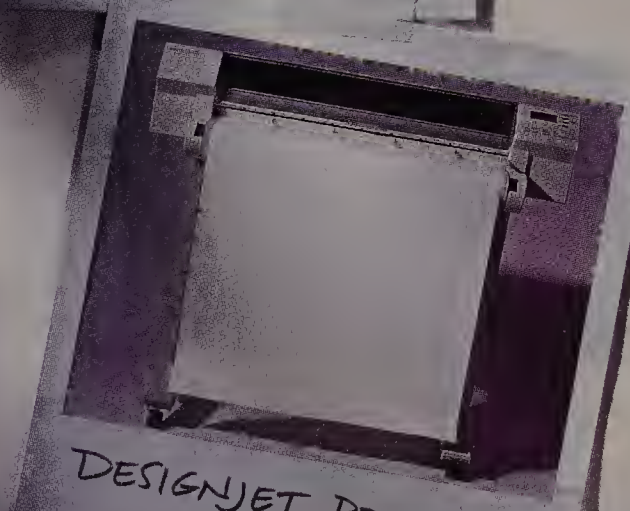

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JETDIRECT PRINT SERVERS

NOTE: OUR FAMILY HERITAGE.

As you'd expect, our JetDirect print servers are chips off the HP block. So quality and reliability are givens. And so is full compatibility with HP printers, new and old. On virtually any network.

But did you know how well our print servers manage all your printers? Even the ones we don't make.

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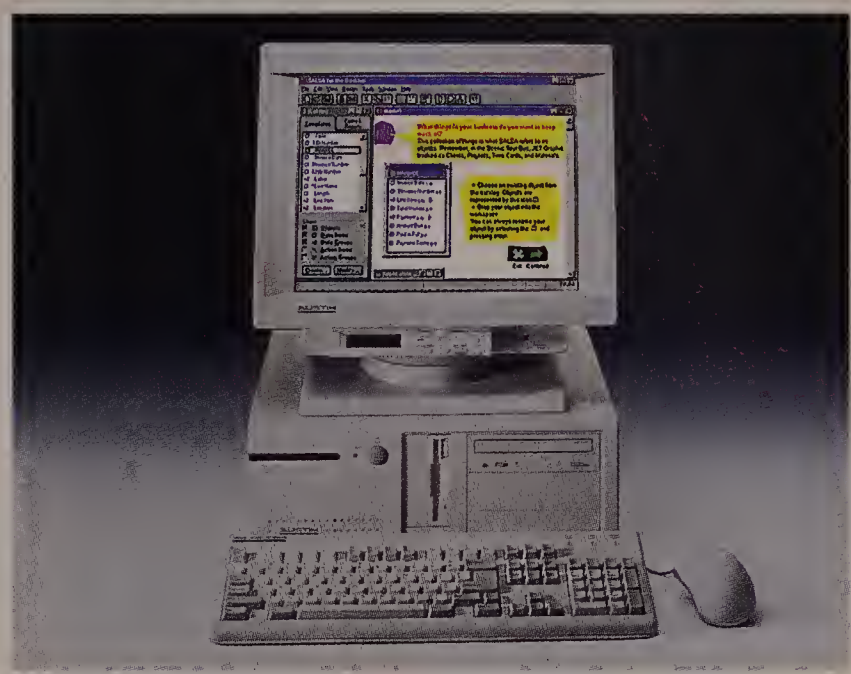
Pentium-200s: Fast, But Worth the Cost?

Like the first batch of 200-MHz Pentium PCs we previewed in our July issue (see "Pentium-200s: Faster by a Hair," *Top of the News*), the second wave of P-200s are the speediest Pentiums we've tested—but they're only slightly faster than their P-166 counterparts. In fact, PC WorldBench scores for the P-200s from Austin, Multiwave Technology, and Tangent Computer previewed here were just 2.5 to 6 percent higher than those for comparably equipped P-166s.

Naturally, you may wonder: If the performance difference between Intel's two fastest Pentium processors is so small, why not opt for the less expensive P-166? While the P-166 may be better for business users, power mavens shouldn't rule out the P-200. The reason? Since Intel has priced the P-200 chip just a bit higher than the P-166, system vendors are charging a mere $100 to $200 extra for the slightly faster CPU. For instance, Multiwave's 200-MHz Ultra Star costs only $110 more than the company's similarly equipped P-166. So if you need extra power for multimedia applications such as video conferencing or 3-D animation, a P-200 may be worth the added cost.



AUSTIN'S POWERPLUS P-200 system costs about $100 less than similar systems, but it also has a smaller hard drive—only 1.2GB.

PowerPlus P-200

High-end multimedia machine.
Austin
800/331-1501
Street price: $2999
Reader service no. 726

Ultra Star

Powerful home office PC with extensive software.
Multiwave Technology, Inc.
800/234-3358, 818/333-8558
Street price: $3120
Reader service no. 727

Tornado MediaStorm 200

Comes with built-in speakers for cramped desktops.
Tangent Computer
800/342-9388, 415/342-9388
Street price: $3195
Reader service no. 728

PowerPlus P-200

As you'd expect, P-200 systems are priced at the high end of the spectrum. Austin's new PowerPlus is no exception. It costs $2999 and features 16MB of RAM, a smallish 1.2GB hard drive, and a 17-inch color monitor. It also has an internal 28.8-kbps fax-modem.

The PowerPlus's graphics subsystem includes a VideoLogic GraphicsStar 400 accelerator board with 2MB of DRAM. The 8X CD-ROM drive and Crystal Lake wavetable sound card make this system a potent multimedia machine. The PowerPlus's PC WorldBench score of 201 was roughly 2.5 percent higher than those of comparably equipped P-166s we've tested.

Ultra Star

Targeted at home office users, the $3120 Ultra Star features 16MB of RAM, a 2.5GB hard drive, and a Matrox MGA Millennium 3-D graphics accelerator with 2MB of WRAM. The Ultra Star was about 4.5 percent faster than similarly configured P-166s.

Multimedia aficionados will appreciate the Ultra Star's 8X CD-ROM drive, Sound Blaster AWE 32 wavetable sound card, and 17-inch color monitor. The system also features a 28.8-kbps fax-modem and a home office CD-ROM bundle that includes Microsoft's Encarta, Works, Money, and other titles.

Tornado MediaStorm 200

Priced at $3195, Tangent Computer's P-200 system fared slightly better than the Austin and Multiwave Technology PCs in our tests, performing about 6 percent faster than comparably outfitted P-166s. The Tornado MediaStorm 200 comes with 32MB of RAM, a 2GB hard drive, and a 128-bit STB Lightning graphics accelerator with 2MB of MDRAM.

Featuring built-in stereo speakers and a microphone, the MediaStorm's desktop case is convenient for anyone with a cramped workspace. Other key multimedia features include a 6X CD-ROM drive, a Creative Labs Sound Blaster 32 wavetable sound card, and a 17-inch color monitor.

Blame the Bus

So why the less-than-stellar test scores for the P-200s? Blame it on the system bus—the CPU's channel to components such as its secondary processor cache and the main memory. The bus is usually much slower than the CPU.

Although a P-200's internal processing speed is about 20 percent faster than that of a P-166, both chips use a 66-MHz system bus, which limits the performance gain of the newer processor.

—Jeff Bertolucci

Panasonic's Multifunction Laser Printer Beats Competition on Price

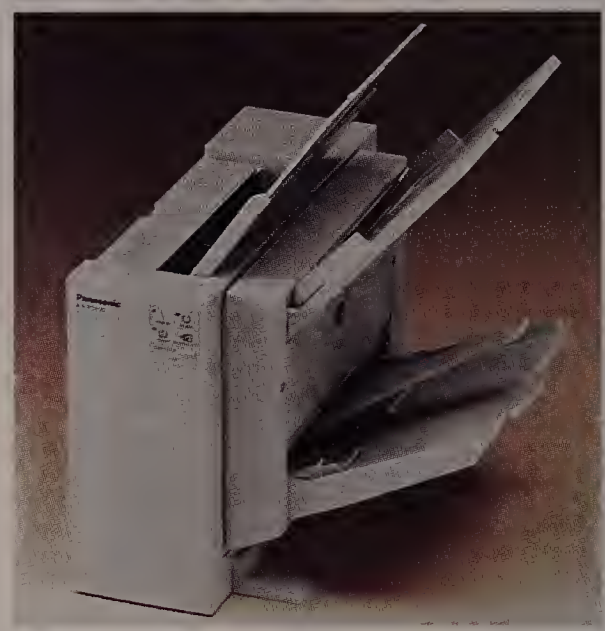
Panasonic's KX-PS600 sets a new price standard for multifunction printers. This $599 all-in-one device includes a 600-dots-per-inch, 6-pages-per-minute laser printer, plus a TWAIN-compliant 300-dpi scanner that works at 5 ppm and also handles copying. The KX-PS600 comes with more capabilities than the similarly priced OfficeJet products from Hewlett-Packard ($549 to $599), which are based on ink jet printers and scan at only 200 dpi. Brother offers laser-based multifunction printers, but they start at $799.

The KX-PS600's cost savings come from a design that works with the system and software you already have. Panasonic assumes that most people own a PC with a fax-modem and a faxing program (or Windows 95, which has fax software). On the other hand, most Brother and HP units incorporate fax hardware and software, which is one reason they cost more. If you can already fax from your PC, there's no point in paying again for the feature.

The KX-PS600 wasn't ready for testing at press time, but we saw a preproduction unit. After you scan something, you drag and drop the document icon onto a function button to save it, fax it, make a copy, or send it via e-mail. The popular packages—Delrina WinFax, Microsoft Mail and Exchange, or Lotus cc:Mail—launch automatically. Panasonic also includes Xerox TextBridge OCR software for converting and editing scanned-in text. The KX-PS600 makes up to 99 copies at a time, at about 4 ppm. Since the device offers up to 600-dpi resolution, the copies look very good.

If you already have a laser printer, you might consider Panasonic's KX-S300. This small 300-dpi sheet-fed scanner gives a printer with PCL emulation scanning and copying abilities. The $199 device plugs into your PC's parallel port; its connector has a pass-through for the printer. Document management software similar to the KX-PS600's lets you drag and drop document icons to print, save, or fax.

—Laurianne McLaughlin



THE PANASONIC KX-PS600 multifunction laser printer undercuts competitive products by nearly $200.

Panasonic KX-PS600

Laser printer does good-quality scans and copies.
Street price: $599

Panasonic KX-S300

Add scanning to standard printers.
Street price: $199
Panasonic Computer Peripheral Company
800/742-8086
Reader service no. 729

Lexmark's Speedy Optra N Challenges HP Models

Lexmark International's new entry in the network laser printer category, the Optra N, is a worthy competitor to Hewlett-Packard's dominant line of network printers. The Optra N is Lexmark's fastest and most versatile printer, and it's priced significantly lower than the competition.

Although Lexmark's Optra N is based on the same feature-packed Canon P550 engine as Hewlett-Packard's $4164 LaserJet 5Si and the $5949 QMS 2425, this network laser printer achieves a rated speed of 24 pages per minute. And Lexmark keeps its unit price reasonable.

Like the Hewlett-Packard and QMS laser printers, Lexmark's Optra N incorporates the same dual 500-sheet paper trays and 100-sheet, fold-out multipurpose tray. Other Canon-made options, including a 2000-sheet input drawer and a duplexing module, are also available. And like the Hewlett-Packard and QMS models, the Optra N has a base resolution of 600 by 600 dots per inch.

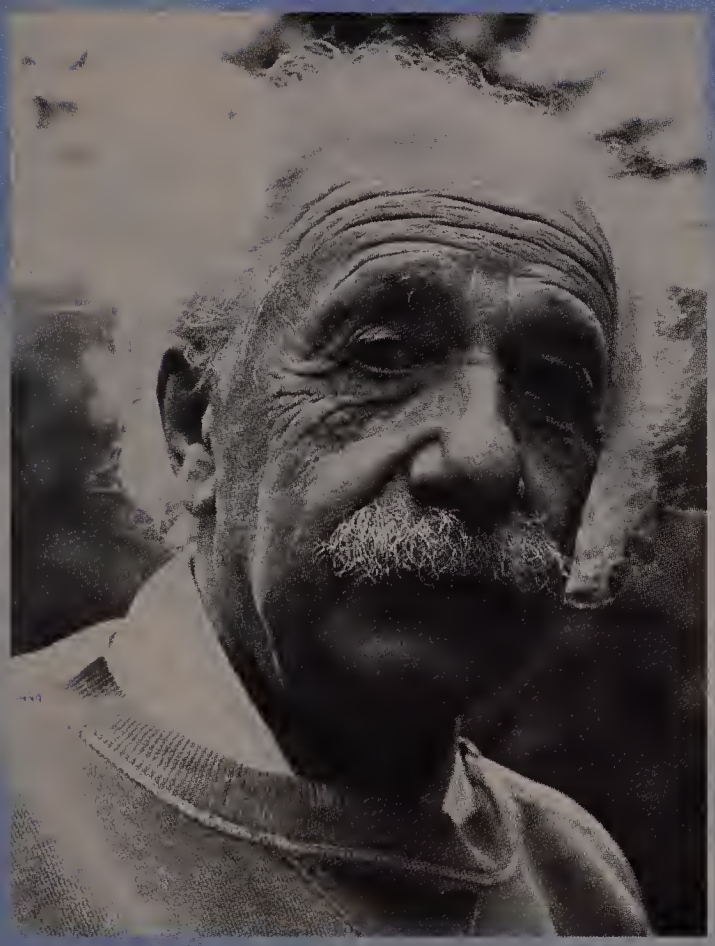
For complex graphics files, the Optra N may be as fast as the QMS 2425, which just edged out the HP LaserJet 5Si in overall speed last month (see "Workgroup Printers: All-Star Lasers," *PC World*, July 1996). Print speed test results for the Optra N were not available at press time.

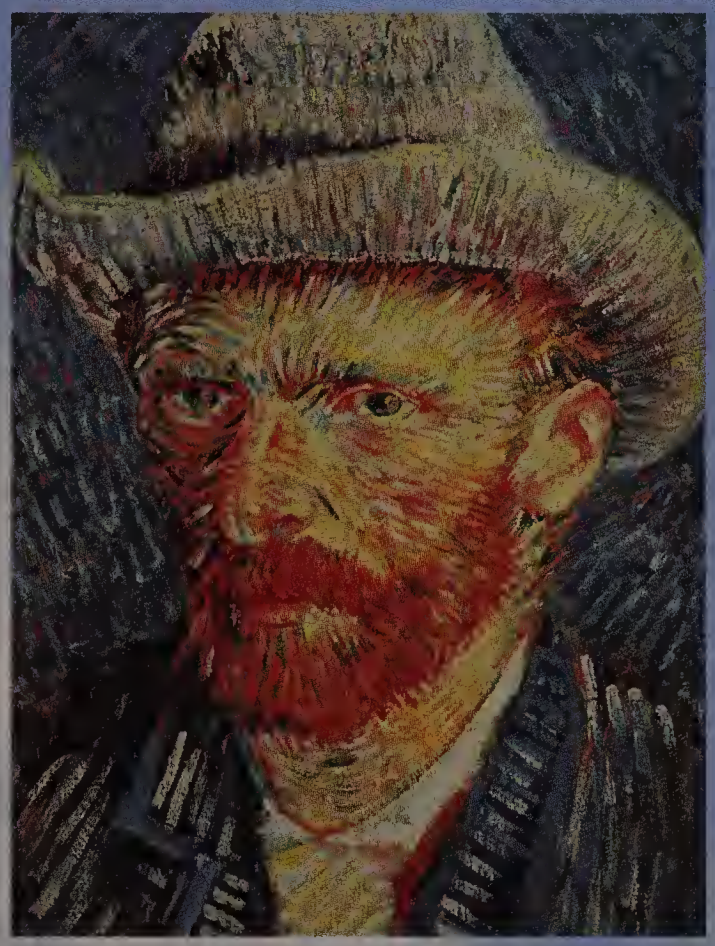
Lexmark International manufactures two versions of the Optra N; their only differences are the amount of memory they include and their interfaces. The Optra N 240, which costs $2850 on the street, comes with 4MB of RAM. The Optra N 245 costs an additional $750 and includes a 10BaseT ethernet connection and an extra 12MB of RAM.

—Bill Underwood

Optra N 240, 245

Newest 24-ppm network printers from Lexmark.
Lexmark International, Inc.
800/891-0331
http://www.lexmark.com
Street price: $2850 (for 240), $3600 (for 245)
Reader service no. 730





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Panasonic: PD-CD Drive Shines

Optical storage drives are gaining popularity in the computer industry, largely due to their data stability (they're less prone to damage by natural elements or from being dropped) and their cost advantage per megabyte. Optical storage is standard in all PD-CD drives, but until recently this technology was limited to desktop PCs.

Panasonic's new CF-62 is the first notebook PC that uses a PD-CD drive—a combination 650MB Phase-Change Dual (PD) rewriteable optical drive and 4X CD-ROM drive—and packages it with a full array of high-end and ruggedized notebook features.

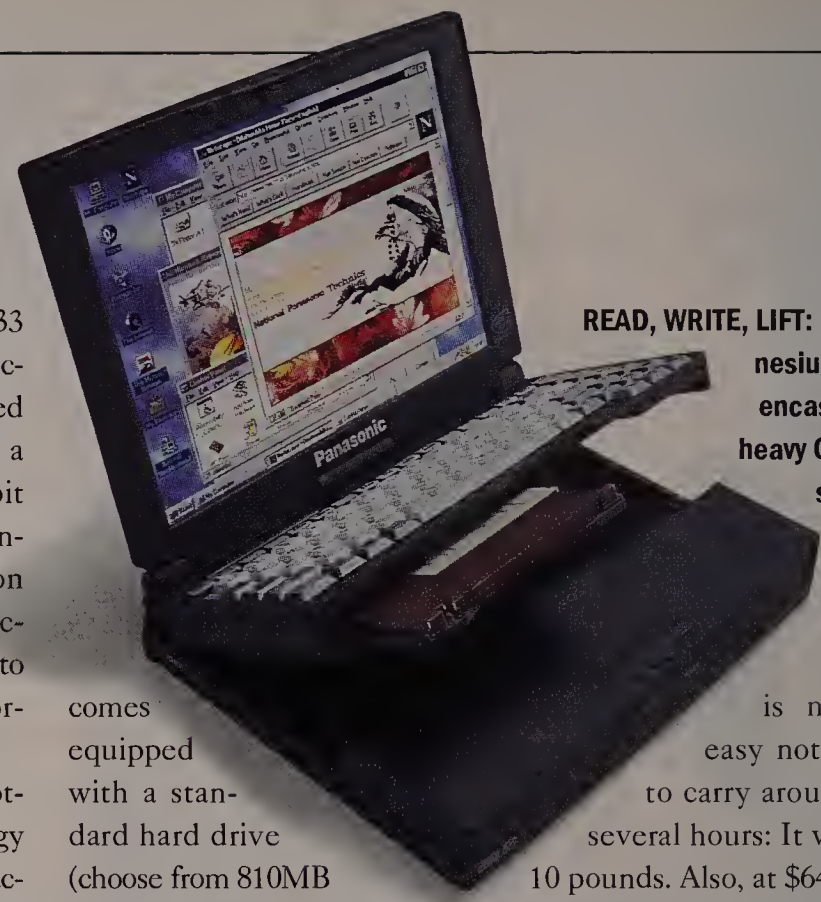
The PD-CD drive rests out of sight underneath the keyboard. At the push of a button, the keyboard lifts up and the disc tray extends. When you insert a CD, the tray retracts and the keyboard returns to its regular position. However, the PD-CD drive's two functions can't be used simultaneously.

Because the Panasonic CF-62 is aimed at salespeople who work in rough terrain, the notebook's screen is encased in a tough magnesium alloy.

The PD-CD drive is certainly the feature of note on this notebook, but the CF-62 also includes a Pentium-100 or -133 processor, a 12.1-inch XGA active matrix screen, two stacked Type II PC Card slots with a Zoomed Video port, 16-bit sound, an IrDA-compatible infrared port, and a lithium-ion battery. We saw a preproduction model and were unable to test the notebook's performance or battery life.

If you're thinking of adopting optical drive technology but are nervous about embracing it completely, rest assured that the Panasonic CF-62 also comes equipped with a standard hard drive (choose from 810MB or 1.35GB) and a 1.44MB floppy bay. But the CF-62 is not an easy notebook to carry around for several hours: It weighs 10 pounds. Also, at $6479 for the P-133 model, it isn't cheap.

—Eric Hellweg



READ, WRITE, LIFT: A magnesium alloy encases the heavy CF-62's screen.

Panasonic CF-62

Optical drive storage notebook for off-road computing.
Panasonic
800/662-3537
Street price: P-133 version $6479, P-100 version $5399
Reader service no. 731

Dynamic Digital Cameras from Epson, Canon

If you've been waiting for color digital camera prices to go down, read on. Two of the top names in PC-related hardware, Epson and Canon, have released their first digital cameras—at breakthrough prices.

The new Epson PhotoPC Color Digital Camera is the first low-end digital camera to have a street price under $500. During a hands-on review, we found the PhotoPC and its EasyPhoto software easy to use. The quality of the images was as good as any for an entry-level camera with basic features such as a 6mm autofocus lens (2 feet to infinity) and built-in flash. Its 1MB of internal RAM can store 16 images at 640 by 480 resolution, or up to 32 images at the 320 by 240 resolution. Options are also available at an extra cost, including add-on lenses and filters and an AC adapter. External memory modules cost $149 for 2MB and $249 for 4MB.

At $949, Canon's new PowerShot 600 costs almost twice as much as the PhotoPC, but it also offers more high-end features, including the ability to capture high-quality images—832 by 608 pixels in 24-bit color—and record sound clips. Although we did not receive a unit in time for a hands-on review, the PowerShot 600's powerful CCD sensor, 7.5mm autofocus lens with macro-focusing (from 4 to 16 inches), and variable shutter speeds should provide serious photographers with excellent color results. Besides holding 1MB of internal memory, the PowerShot 600 can also use PC Cards for image storage: A 4MB card costs $229; a hard drive card is $380. Bundled software includes Ulead's PhotoImpact and ImagePals for editing.

Both cameras are intended primarily for business users such as real estate agents. If you just want to capture images for including on Web pages, the PhotoPC is probably good enough. But for graphic designers and publishing professionals who demand high-quality color, the PowerShot 600 is the logical choice.

—Richard Jantz

Epson PhotoPC Color Digital Camera

Affordable entry-level digital camera.
Epson America, Inc.
800/463-7766,
310/782-0770
Street price: $499

Canon PowerShot 600

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Canon Computer Systems, Inc.
800/848-4123,
714/438-3000
Street price: $949
Reader service no. 732

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Data compression is as important now as it was when hard drives were small and modems were slow. New software applications and the files they create continue to grow in size. Intranet and Internet traffic are growing at a phenomenal rate. These growing trends make zipping and unzipping data files an important utility for everyone who uses a personal computer.

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- 2.5GB Hard Drive [12ms]
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- 8X EIDE CD-ROM Drive
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- 16MB EDO Memory
- 256KB Pipeline Burst Cache
- 1.6GB Hard Drive [10ms]
- 15TX Trinitron Monitor (13.7" v.i.s.)
- 64-bit PCI 2MB DRAM Video
- 8X EIDE CD-ROM Drive
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PICTURED SYSTEM

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DELL LATITUDE XPi P100SD

- NEW Network-ready Notebook
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- 256KB L2 Cache
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- PCI Bus with 128-bit Graphics Accelerator
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Two Free Programs Deliver News to Your PC

Bookmarks used to seem like a Web surfer's best friend. But after a few sessions, even the most organized user can be overloaded with bookmarks. And bookmarks can't alert you when a favorite page has been updated. This can be a real problem for people who want access to the latest information.

News-gathering programs can make it easier to collect information. We examined two free programs, PointCast Network and FreeLoader, to see which one was more effective.

The basic premise of these programs is the same: Advertising covers the cost of the software, almost guaranteeing it will remain free to users. The software gathers updated information from various sources and brings it to you in a packaged format. And both have screen-saver components that run when your system is idle.

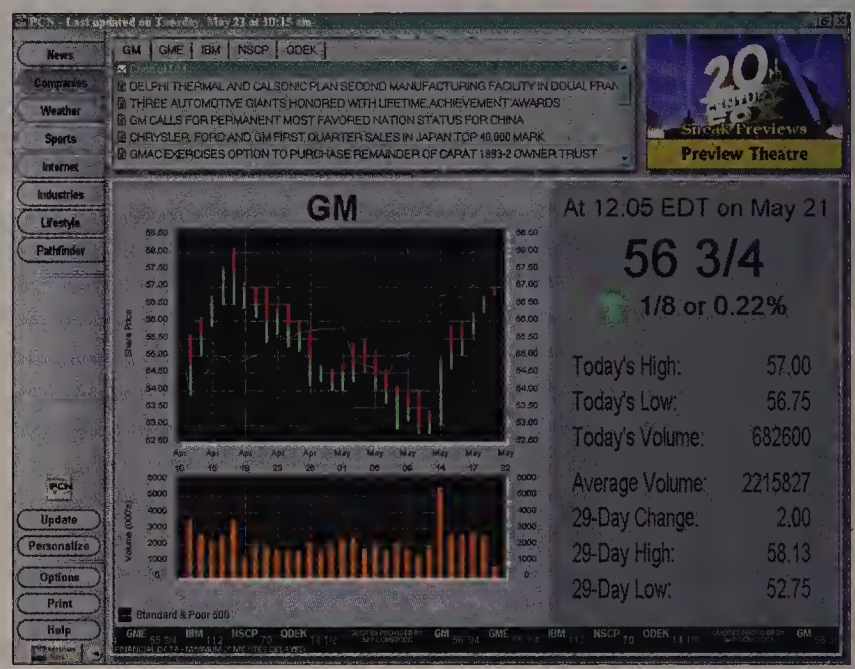
FREELOADER SUGGESTS APPROPRIATE WEB SITES in various categories.

PointCast Network

PointCast Network wowed us when it was first released in a beta version earlier this year. In screen-saver mode, PointCast runs headline tickers across your screen—one click takes you to a story. (Click outside PointCast's windows to get to your other applications.)

The full version of this program, available at the PointCast Web site, culls news, weather, horoscopes, stock quotes, entertainment, and sports updates from various sources, including PR Wire and Business Wire. PointCast gets additional content from *Time*, *Money*, and *People* via Time Warner's Pathfinder site. The program lets you search weather forecasts and maps of roughly 250 cities. And a new information feature for the Boston and Los Angeles areas debuted in May: Just type in a zip code to get local news from the *Boston Globe* and *Los Angeles Times*.

In its full-screen mode, PointCast displays four windows: a control panel, a small advertising window, a list of available stories, and a window for viewing the text of a story. You can filter out categories, like Sports, but you can't fine-tune the frequency of different updates the way that FreeLoader allows: When PointCast scans for new stories, it updates all your selected categories at once. Its default browser is Netscape Navigator 2.0.



POINTCAST NETWORK REGULARLY UPDATES STOCK QUOTES and business news for the companies you select.

FreeLoader

FreeLoader, available at http://www.freeloader.com, takes a different approach. Rather than give you a standard plate of information sources, FreeLoader lets you cherry-pick a personalized selection from suggested Web sites and content partners. Like PointCast, it breaks the sites down into categories such as News or Entertainment. Looking for good recipes? Select the Epicurious Web site. Trying to keep up with the latest rock group? Tune in to RadioNet. *USA Today* and Lead Story, an AT&T Business Network Web site, are among FreeLoader's content partners.

You can choose how often FreeLoader refreshes the headlines from the Web sites you've selected: hourly, daily, or weekly. You may want updates only once a week for sites such as Epicurious, but you might want updates for news resources more often.

In screen-saver mode, rather than running headline tickers across your screen, FreeLoader uses colorful bubbles with dynamic links—one click and you go to FreeLoader's Web site.

For some people, software like FreeLoader and PointCast takes the headache out of checking for daily news, entertainment updates, or even stock information on the Web. But there is a trade-off: Both packages slowed our 75-MHz Pentium test system when running in the background. And after a while the novelty of the tickers wore off; it was easier just to zip off to one or two sites directly. But since the programs are free, they're worth trying out for yourself.

—Gabrielle Mitchell

FreeLoader, PointCast Network

Information agents do the surfing for you.

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PointCast Network
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HotDog Professional 2.0 Serves Up Hands-on HTML Editing

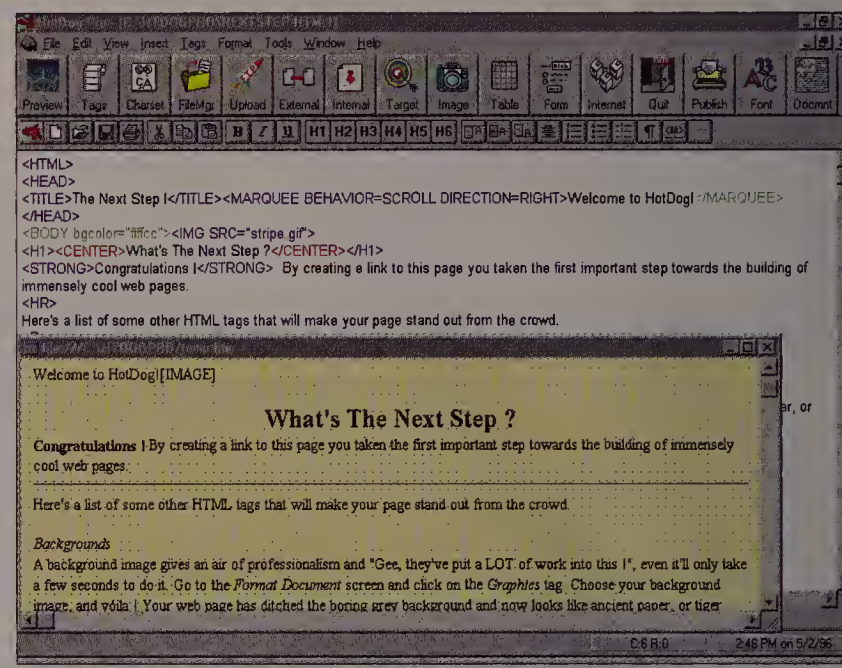
Although editing Web pages can often seem intimidating, HotDog Professional 2.0 is a stand-alone Hypertext Markup Language editor that combines a playful interface with advanced editing features. You'll find customizable toolbars and document templates, tools for building forms and tables, an HTML syntax checker, and support for both Netscape Navigator 2.0 and Microsoft's Internet Explorer 2.0 tags. Novices and experts alike will also appreciate HotDog Pro's super built-in help system, which covers every imaginable aspect of HTML authoring. We examined a shipping version of the software.

Unlike many HTML editors available today, HotDog Pro codes the document in raw HTML. Experienced Web authors may like this control over the HTML code, but if you'd also like to see your code in a browser window, the "Rover" tool (Real-time Output Viewer) displays standard HTML tags as they would appear in a browser window. Be forewarned, however: Rover does not display nonstandard tags, like Microsoft marquees and Netscape Navigator plug-ins.

A few shortcomings: HotDog Pro lacks a collection of backgrounds, graphics, and preformatted document templates for publishing colorful Web pages with minimal effort. And the intuitive appearance of the toolbar was deceiving: For example, to preview my page, I thought I could just click the Preview button. But actually I had to reconfigure my browser, which required digging down to its file directory.

Overall, I'd recommend HotDog Pro as a tool for seasoned Web authors who are eager to experiment with the capabilities of HTML in a relatively unintimidating environment.

—Samantha Parent



EDITING RAW HTML CODE can be tricky, but HotDog Professional makes it easier with customizable toolbars and extensive help.

HotDog Professional 2.0

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http://www.anawave.com
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Reader service no. 754

Corel Provides Suite Solution for Web Publishing

The craze of homespun Web pages has faded somewhat, because creating and maintaining a great home page takes some work. Until recently, creating a cool site with HTML tools was a little like trying to build an interstate highway with a pickax: It could be done, but it'd take forever and might be more trouble than it was worth. We looked at a beta version of the Corel Web.Graphics Suite, a collection of Web publishing tools that upgrade the pickax to a jackhammer.

The core of the suite, Corel Web.Designer, is a desktop publishing application with an interface similar to most word processing programs. You can start your page from scratch or modify one of the 120 included templates. Either way, you can import graphics, create hyperlinks, or insert text into your design. You can embellish your work with images from Corel Web.Gallery, a collection of more than 7500 Internet-ready images including bullets, backgrounds, and clip art.

The suite also includes Corel Web.Draw, for creating custom graphics, as well as Corel Web.Transit, a file conversion utility that converts most documents to HTML format. And if you're interested in more than static pages, Corel Web.Move, an animation application, comes with more than 500 "actors" and 200 "props" that you can use in an animated sequence. Corel Web.World, a Virtual Reality Modeling Language authoring tool, can be used to build a 3-D world. We found it easy enough to create a world with the 50 included templates and 350 textures.

The documentation features color reproductions of all the clip art and images, useful for quick reference. Unfortunately, the information on how to use Corel Web.Designer is limited to just 10 pages. And for tips on creating an eye-catching Web site, you have to consult the on-screen help system, which isn't as user-friendly as we would have liked.

If you aren't a graphic designer, you'll have to spend some time getting used to the features in Corel Web.Graphics Suite—but you'll have most of the tools you need in a single place.

—Shane Mooney

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The Interactive Edition recommends using Netscape Navigator for best results

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Online Integration Keeps Bookshelf's Information Timely

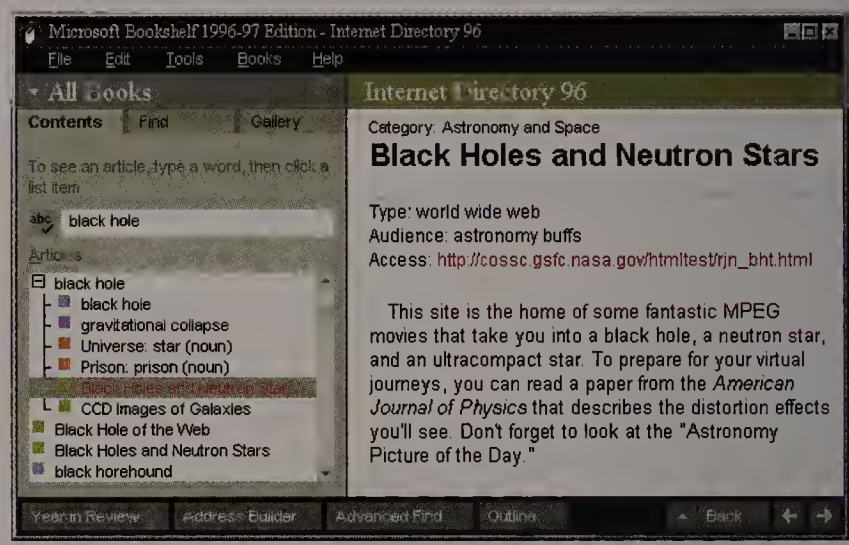
It was hard to imagine what could be done to Microsoft Bookshelf to make it more useful—other than adding more reference books. But the 1996-1997 edition sports a new user interface, near seamless integration between its various reference works, and a handy Internet directory.

Why have an Internet directory on a CD-ROM when there are so many wonderful search tools on the Net itself? Because the Internet integrates well with the dictionary, thesaurus, concise encyclopedia, and other reference works that have been part of Bookshelf since 1987. For instance, if you look up "black hole," you'll get dictionary and encyclopedia definitions, thesaurus listings, and links to appropriate Web sites—complete with descriptions of what you'll find online. Because Internet directories become out of date quickly, free monthly updates are available, albeit through a somewhat clunky interface.

Bookshelf's interface has been overhauled, but the improvements are only marginal. Most of the additions seem like pointless window dressing. For example, you can now pick a reference book from a drop-down menu rather than by clicking an icon. However, the All Books article list doesn't make it easy to tell what book each listed article is from—it wasn't particularly easy before, but now it's harder thanks to unintuitive and unexplained color coding. On the other hand, four of the books contain outlines for complex topics, making it easier to go through them. And you can now access the Address Builder from within the main program.

The Hammond World Atlas has been replaced with a concise version of Microsoft's own Encarta World Atlas, a change for neither the better nor the worse. This version of Bookshelf still runs under Windows 3.*x*, but it's clearly designed with Win 95 in mind, launching automatically when you pop in the CD-ROM. And after all these years, it still lacks a rhyming dictionary.

—Lincoln Spector



THE LATEST MICROSOFT BOOKSHELF points to useful sites on the Web, in addition to offering standard reference materials.

Microsoft Bookshelf 1996-1997 Edition

Internet integration makes reference more timely.
Microsoft Corp.
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Document Retrieval for the Desktop

Congratulations—you've got a new scanner. Now that you've scanned in every piece of paper on your desk, you haven't the foggiest idea how to sort or find the documents you actually need. But help is on the way. We looked at a beta version of MindWorks' Recollect, a document retrieval and storage program with built-in optical character recognition software. Recollect is a streamlined version of the higher-end Recollect Gold product, but it has some unique features and an attractive street price of $99.

Although most scanners come bundled with software—for example, Visioneer's PaperPort Vx includes a light version of Xerox TextBridge and its own document management program—Recollect provides sophisticated searching and storage options. PaperPort's software requires you to manually enter keywords to conduct a search, confining search parameters only to these keywords and the document names. Recollect, on the other hand, automatically indexes every word by default for its search feature. And, unlike PaperPort, Recollect offers relevancy rankings and the ability to perform fuzzy searches—important since OCR is seldom perfect. As your hard disk fills, the database of images and word indexes can be offloaded to a Jaz drive, Zip drive, or other removable media without requiring you to reindex the images.

The beta version of Recollect we looked at couldn't be installed under Windows 95. MindWorks expects the shipping product to be compatible with Win 95. While most users will be content with the included OmniPage Lite, it is not as comprehensive as OmniPage Professional, and no alternative OCR engines are permitted. And you can't import compressed WinFax files into Recollect—the files first must be uncompressed. Recollect does not support color images, but neither does the current generation of low-end scanners.

—Lawrence Kingsley

Recollect

Document image filer allows fuzzy searches.
MindWorks
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Marrying Presentation Software and the Web

I like the World Wide Web as much as anybody else, but the technology has some limitations—particularly for businesspeople. For example, creating sales and marketing tools, such as presentations and product demonstrations, for a Web site is tricky for many computer users. Multimedia authoring tools, like Macromedia Director, let you create eye-popping multimedia presentations, but they won't run from a Web site without some kind of add-in, like Shockwave. Programs like Software Publishing's ASAP, which has special Web publishing features, let people view a presentation on a Web site, but the viewer's ability to interact with that presentation is limited.

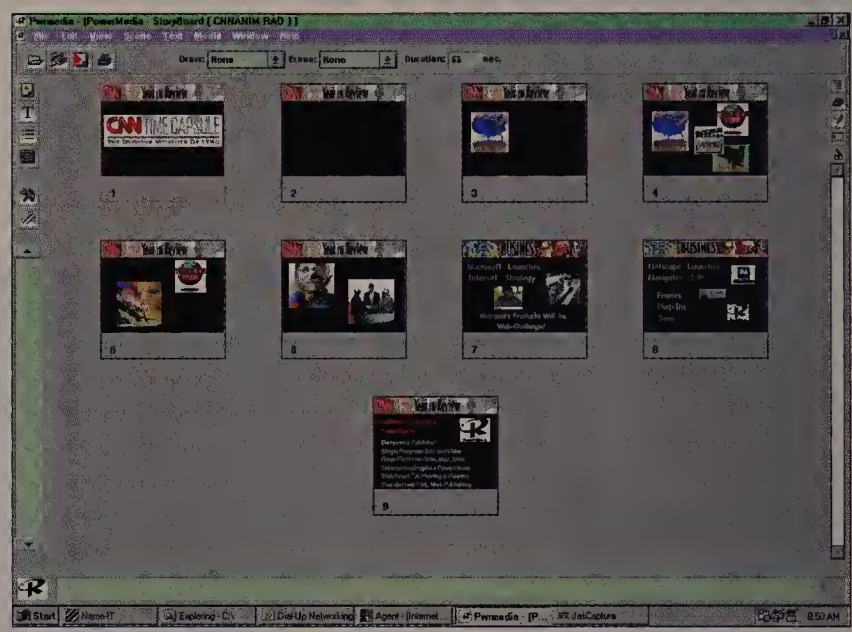
RadMedia's PowerMedia is a presentation program that addresses some of these issues. The product lets you add video, audio, and other slick features to presentations and demos that can be saved in HTML format, so that customers and staff can view your creations with a Web browser. With some effort you can add interactive features, such as the ability to route people to different parts of a presentation, depending on how they respond to a question. Another nice feature: The product lets you create presentations that can run on a Web server or stand-alone PC. As a result, you can create a product demonstration once and post it to your Web site; your staff can download the same file and run it on a notebook PC equipped with PowerMedia.

The product offers features found in presentation software, including templates that make creating slides easy, built-in image editing and illustration tools, and extensive import tools for adding PostScript art, video, and audio to your productions. Native support for Web protocols such as HTTP, FTP, and MIME means you can import Web pages or objects—like your company logo—directly into PowerMedia. PowerMedia sports sophisticated multimedia authoring tools à la Macromedia Director, such as storyboarding, which allows you to create thumbnails of each slide in your presentation so you can get a bird's-eye view of your creation.

The product can run as a plug-in for Netscape Navigator 2.0 or higher or as an add-in for Microsoft Internet Explorer 3, which will be released in the second half of 1996.

Though PowerMedia includes on-screen step-by-step tutorials to automate the authoring process, I still found this product difficult to learn and use—even with a support person guiding me for more than an hour over the telephone. Of slightly less concern, the "gold" copy I examined (the final version before manufacture) ran sluggishly on my 90-MHz Pentium system, which has 16MB of RAM. Though PowerMedia is tricky to learn, for many people it will be worth the effort.

—John P. Mello Jr.



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PowerMedia

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ExpensAble Adds Forms, Genies

I hate doing expense reports. Receipts stack up, some get misplaced, and I invariably lose money on my trip.

Expense reporting software like Quicken ExpensAble 2.0 takes a lot of the hassle out of writing reports. Intuit's clever Genies—a twist on Microsoft's Wizards—like the new Trip Genie, walk you through your travel plan so you can recover expenses you might otherwise overlook. International travelers can use the new Foreign Currency Genie to figure exchange rates. And ExpensAble 2.0 retains the Hotel Genie, which lets you enter your hotel bill in a window, then breaks it down on an expense form.

Intuit added more expense form templates to this version; there are now 30 in all. Also, you can export your data to Excel, which is helpful if your company uses .xls templates. But I found this step to be impossibly cumbersome. Frankly I'd rather work entirely in Excel than go through the data-linking steps. Although ExpensAble 2.0 has a cleaner interface overall than its competitor, Portable Software's $69.95 QuickXpense, I prefer QuickXpense's simple interface and its HotelXpert.

—Gabrielle Mitchell

Quicken ExpensAble 2.0

More forms, still lags behind QuickXpense.
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Dueling Typing Tutors: Mavis Beacon Faces a Challenger

Typing isn't much fun, and if you're a slow typist like me it can be a real drag. But two new typing instruction programs, Mindscape's Mavis Beacon Teaches Typing 4 and Individual Software's Typing Instructor Deluxe CD, can help you get up to speed.

Both of these programs run under Windows 95 as well as Windows 3.*x* and use multimedia to engage your interest.

TYPE YOUR WAY TO THE TOP in Cliffhanger, a game in Typing Instructor Deluxe CD. It's a typing contest of speed and accuracy.

The shipping version of Typing Instructor I saw features a travel theme. You start in an airport lounge and select exercises, tests, and games at the check-in counter. You can even choose background music.

The most fun comes in the program's typing games, such as Cliffhanger, where you try to beat a computer opponent to the top of a cliff by typing quickly and accurately.

The Mavis Beacon CD-ROM takes a more corporate approach. You sit in a virtual classroom and practice repetitive fingering routines, including many on-screen drills, and there's less multimedia than in Typing Instructor. The upcoming version of Mavis Beacon, which I saw, improves the software interface, but Typing Instructor is still more fun.

—Richard Morochove ▶

Mavis Beacon Teaches Typing 4

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Mindscape
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DELORME

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Free Crash Courses in Foreign Languages

Whether it's a business trip to Tokyo or a vacation in Puerto Vallarta, you need to speak a little native dialect when traveling in a foreign locale. For a free crash course, visit travlang's Foreign Languages for Travelers (http://www.travlang.com/languages/) for help with basic skills in about 30 languages, including Dutch, French, German, Hebrew, Italian, and Japanese.

The drill couldn't be easier: Just click to specify the language you speak and the one you want to learn, then go to pages that list frequently used words and phrases for that particular language. Each foreign language page covers the same key topics: basic words, shopping, dining, and common questions (and answers) such as, How much does this cost?

Most words and phrases are attached to short sound files that give the proper pronunciation. To listen to these files, you need a Web browser with a sound utility, such as Netscape Navigator or Microsoft Internet Explorer, plus a sound board–equipped PC. Unfortunately, there's no way to download the entire collection of sound files for a given language (for offline practice), but some browsers let you save sound files.

You'll also find general language pointers, online translation dictionaries, and links to country-specific sites.

—Richard Jantz ▶

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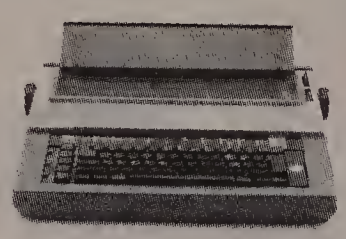

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— PC MAGAZINE ONLINE, FEB. 26, 1996
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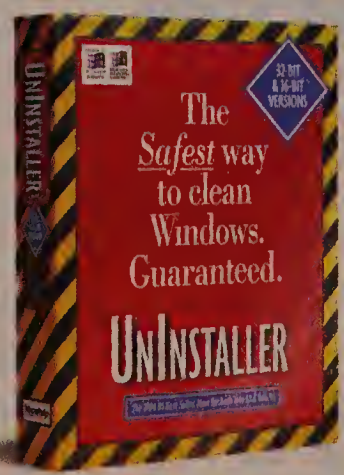

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Circle 153 on reader service card

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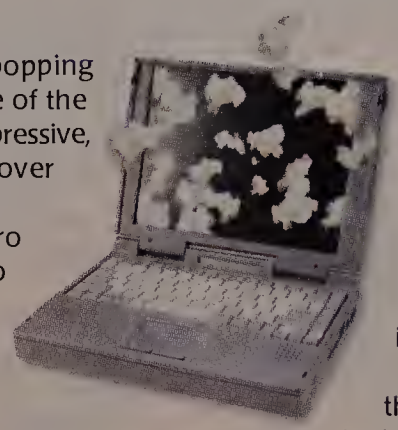

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Circle 38 on reader service card

Put E-Mail in the Palm of Your Hand

TO: Harry McCracken
FROM: Michael Lasky

I am declaring today Laptop Freedom Day. I won't be schlepping that heavy laptop to the last gate at the airport anymore. I only traveled with the damn machine so I could send and receive e-mail anyway. I'm sending this message from my Psion 3a palmtop computer using a beta copy of Psion's new PsiMail software, which handles cc:Mail and Microsoft Mail messages, complete with file attachments.

The Psion Series 3a weighs about 10 ounces and runs for weeks on two AA batteries, but it packs a lot of processing power. It handles PC documents easily, converting Microsoft Word, 1-2-3, and other file formats on the fly when I get file attachments. When I open an attachment, it launches its word processing or spreadsheet application so I can use the file.

TO: Michael Lasky
FROM: Harry McCracken (James Bond)

I dread lugging a notebook as much as you do—I read your message on a Sharp Zaurus ZR-5800FX palmtop, using a beta version of Sharp's new Zaurus Access e-mail package. The Zaurus weighs 13.8 ounces, and its software is far better than cc:Mail Remote, which I use on my notebook. When I dial in with the Zaurus palmtop, I can scan the titles and sizes of waiting messages and pick those I want to download. I can also choose to get messages only from specific people—or retrieve previously read mail. As with PsiMail, I can retrieve attachments and use them with the Zaurus's built-in apps; the only catch is that the Zaurus supports only Excel 4.0, Rich Text Format, and ASCII file formats.

TO: Harry McCracken (James Bond)
FROM: Michael Lasky

James Bond? Are you having an identity crisis? Anyhow, setting up PsiMail took about 15 minutes—it was just a matter of installing the gateway program on my computer and downloading the client software to the Psion 3a using the $99 PsiWin connectivity package and its included cable. The install program allowed me to choose the people I wanted to receive e-mail messages from on the Psion. Then I configured PsiMail on my palmtop with information such as my password and the maximum size message to accept.

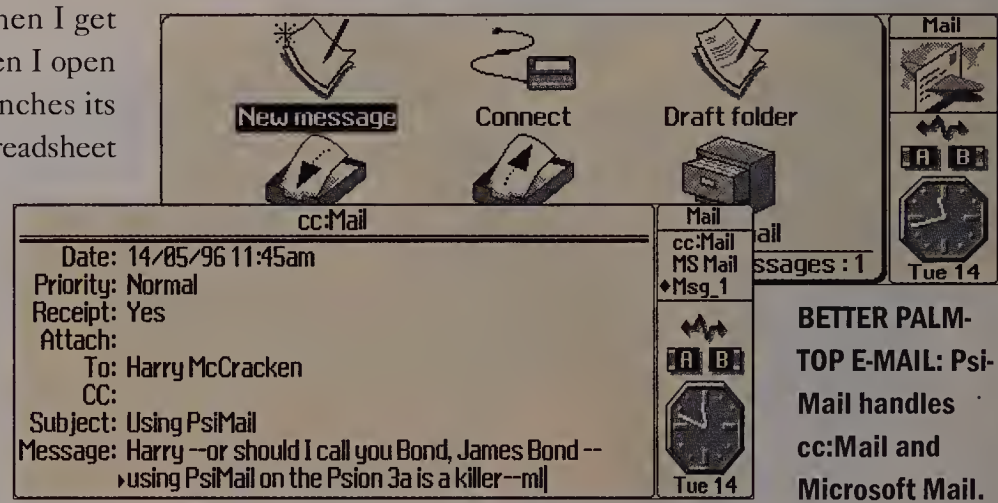
When I leave the office, I keep the PsiMail Gateway software running on my desktop PC to serve as a connecting agent: When I dial in to my desktop's modem from the Psion, the Gateway connects to the company e-mail server to send and receive my messages.

TO: Michael Lasky
FROM: Harry McCracken (James Bond)

Configuring the Zaurus is also easy, and the palmtop's software is built into ROM, so there's no need to transfer it from a desktop PC. I leave the gateway software running on my PC as you do. But I did encounter a few quirks. Most notably, the Zaurus software requires that my e-mail address be less than 15 characters long. My cc:Mail name is "Harry McCracken," (too long, with the space), so I needed a shorter alias. Our system manager chose one with a license to kill.

As convenient as palmtop e-mail is, it's not perfect. The Psion 3a and Zaurus come with a maximum 2MB of memory, which quickly gets eaten up by file attachments, and the Psion and Sharp modems are glacial 2400-bps models. (The palmtops work with faster third-party modems, and at press time Psion planned to introduce a $299 14.4-kbps modem.) Your office computer will need its own phone line and modem, unless your company sets up a PC as a mail server for multiple palmtop users.

—Michael S. Lasky and Harry McCracken



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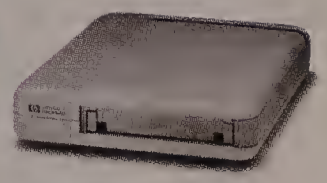

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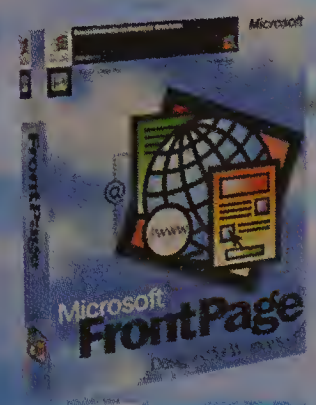

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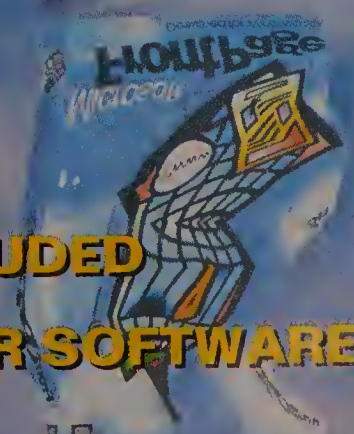

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All-in-One Fax, E-Mail, Voice Mail, and Web Access for Small Offices

Connect one of the new generation of advanced modems to your PC and it becomes a communications center—you can handle data, fax, e-mail, voice mail, and World Wide Web browsing. The gotcha is, you'll need software for each application, and though most modems ship with software, you seldom find everything you need. Global Village is introducing a solution with FocalPoint, an all-in-one package that handles various aspects of communications, tying features together with one interface. Though we couldn't test the product at press time, it looks promising.

Global Village says FocalPoint works with virtually any fax-modem, but to take advantage of the voice mail features, you need a voice-capable modem. FocalPoint's installation is designed to detect your modem and set the correct parameters.

FocalPoint's fax features include a cover sheet editor, optical character recognition, broadcast fax, and fax on demand. The program's telephony features include support for Caller ID, call logging, speakerphones, and canned music for calls on hold. FocalPoint's voice mail supports up to 1000 password-protected mailboxes.

The software can retrieve e-mail messages at preset intervals from America Online, CompuServe, and the Internet and can work with your existing Internet service provider. For beginners, it comes with Quarterdeck's Mosaic-based Web browser, Quarterdeck's WinSock, and automatic sign-up with a number of national Internet service providers.

FocalPoint, a 16-bit application, works with both Windows 3.1 and 95. Its many features will take a while to explore and use. But at a street price of $99, FocalPoint is affordable.

Communicate, a similar all-in-one package that Communique Laboratory (800/668-2185) plans to ship in July for a list price of $179, wasn't available for review at press time.

—Stan Miastkowski

ALL-IN-ONE COMMUNICATIONS: FocalPoint integrates software for faxing, voice mail, and Internet access.

FocalPoint

Software integrates communications tasks.
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http://www.globalvillage.com
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Reader service no. 649

Call Routing for Home Offices

It's a cosmic rule: The minute I walk out the door, I get important calls. My answering machine will take a message, but there are some clients I want to talk with right away. To address this problem, I tried out SoloCall, a $495.95 call-routing device. It does its job, but I didn't find it convenient enough to keep using.

SoloCall transfers calls to me no matter where I am. The SoloCall box looks a lot like a modem. It has six phone jacks: two for incoming phone lines, one for an answering machine, one for a stand-alone fax machine, and two for additional phones. It can also connect to your PC's serial port, but the product doesn't require a PC.

SoloCall needs at least one phone line plus three-way calling (Pacific Bell charged me $5 to install this service plus $3.50 a month). To access the more powerful features, such as voice mail monitoring, you need two phone lines.

SoloCall can direct calls to my answering machine if I don't pick up after a specified number of rings. It can also route all calls to my cellular phone for an afternoon or, alternatively, ring my cellular phone and let me listen in on voice mail. I can click in to take the call if I wish.

SoloCall also lets me create greetings ("Press 1 to be transferred to my cell phone, or press 2 for my answering machine"). I can give important callers ID code numbers to enter so their calls arrive first.

SoloCall has too many drawbacks for me. You can create the call-routing instructions using a telephone keypad, but it's extremely inconvenient. You can also create call-routing instructions using a bundled Windows program. Though I had a shipping version, I ran into some installation snafus under Windows 3.1. Finally, SoloCall is expensive.

—Steve Bass

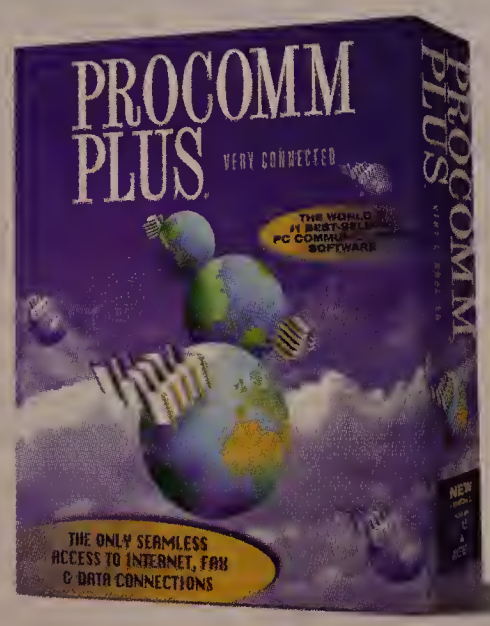
SoloCall

Expensive call-routing device is sophisticated, but not always easy to use.
SoloPoint
408/364-8850
http://www.solopoint.com/
List price: $495.95
Reader service no. 650

QUARTERDECK

DOWNLOAD INFORMATION
FAX, FAX, FAX
TRANSFER FILES
SEND INTERNET EMAIL
COMMUNICATE VIA YOUR PC

You get the idea.



Every on-line connection is now seamlessly brought together in PROCOMM PLUS 3.0. And it's all accessible through the Connection Directory: fax, data, voice numbers, email, Web, Telnet, FTP and news entries. Not to be redundant, but we've connected all your connections. It's a first.

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Internet · Fax · Data

Space-Conscious Scanner

Visioneer's original PaperPort wowed us with its sleek design and easy-to-use software. Now meet the $349 PaperPort ix, a scanner-keyboard combination. The standard-size QWERTY keyboard has a built-in number pad and Windows 95 hot-key controls; you scan documents by feeding paper into a slot at its top. Visioneer's software installed perfectly, even in the preproduction version we examined under Windows 95. To get set up, you plug one cable into your PC's keyboard port and another cable into a serial port (we used COM1). We scanned receipts, business cards, and faxes; used the built-in version of Xerox's TextBridge OCR software to edit scanned text; and organized the documents with Visioneer's electronic filing system. The only problem is that it's not always clear how to export data from some scanned items, such as receipts, to compatible programs. Also, some people prefer a split-design keyboard for ergonomic reasons. Otherwise, PaperPort ix is a dream. Visioneer, 800/787-7007.

Reader service no. 733

KEYBOARD AND SCANNER IN ONE: The PaperPort ix keyboard gives you a document scanner that doesn't require any added desk space.

Keyboard to Go

Whether you use it at a cramped desk or on an airplane tray table, the Foldable Keyboard from Janesway Electronics is handy if you need a full-size keyboard to type comfortably. The 101-key board can be packed in a drawer or briefcase. We tried out a shipping version. The 2.4-pound plastic unit is hinged in the middle for a compact closure. While the keys are responsive and click solidly, they look cheap, no doubt because they're made of low-grade plastic. Also, the PC cable on the keyboard isn't detachable, so it doesn't wrap up tightly. List price is $69. Janesway Electronics, 800/431-1348.

Reader service no. 734

A BBS for the Nineties

Think bulletin board services are primitive and a bit out of date? That's not true of a BBS constructed using Wildcat 5 from Mustang Software, a veteran maker of BBS applications. A Wildcat BBS is an interactive Web site with all the trimmings: chat rooms, message boards, and other features. You can create a corporate intranet or a community BBS for your school or nonprofit organization, even a virtual storefront for your business. And you don't have to learn HTML coding to set it up. After downloading the free client software, either from your site or Mustang's, anyone with a Web browser can completely access your site's content and chat with other users. The 32-bit software runs on Windows 3.*x*, Windows 95, and NT. List prices start at $149. Mustang Software, 805/873-2500.

Reader service no. 735

Now Hear This

Speaker companies pile on the mumbo jumbo to promote their products. For Yamaha, it's the patented Yamaha Active Servo Technology, or YST. But how does YST translate into what you hear? In the case of the sleekly handsome YSTM15 speakers, it means astonishingly good sound for the $99 price. We tested a shipping version. Traditionally, manufacturers have enlarged the speaker enclosure so as to improve low (bass) frequency performance. Yamaha's YST overcomes the space problem by electronically forcing the sound cone to behave as if it were in a much larger enclosure. The result is a rich, crisp, balanced sound (10 watts per channel) that doesn't distort at high volumes. The front panel has volume and balance controls and a convenient headphone jack. An output jack and volume control for an optional subwoofer are in the rear. Dual stereo inputs let you run two devices on the speakers. Yamaha Corporation of America, 800/823-6414, ext. 399.

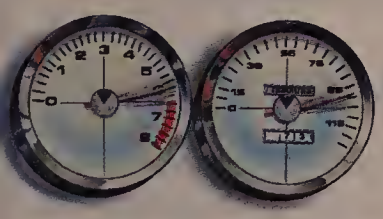
Reader service no. 736

MEGASOUND, MINIPRICE: A new technology makes for impressive bass performance in Yamaha's $99 YSTM15 speakers.

Virus Detection for NT

To guard your Windows NT system, consider VirusScan NT 2.5 from McAfee, a company with considerable experience in virus protection programs. The software scans hard drives, hard drive partitions, or files when you want or at a scheduled time. (You can also scan archived files, although slowly.) If VirusScan 2.5 finds a virus, it sends a warning message to your monitor screen, pager, or e-mail system. The program can also save messages to a designated file. The documentation is sometimes difficult to understand, and we found some quirks in our shipping copy of VirusScan 2.5, such as blank month names in

WHAT EFFECT COULD SPEEDYROM™ HAVE ON YOUR CD-ROM DRIVE?



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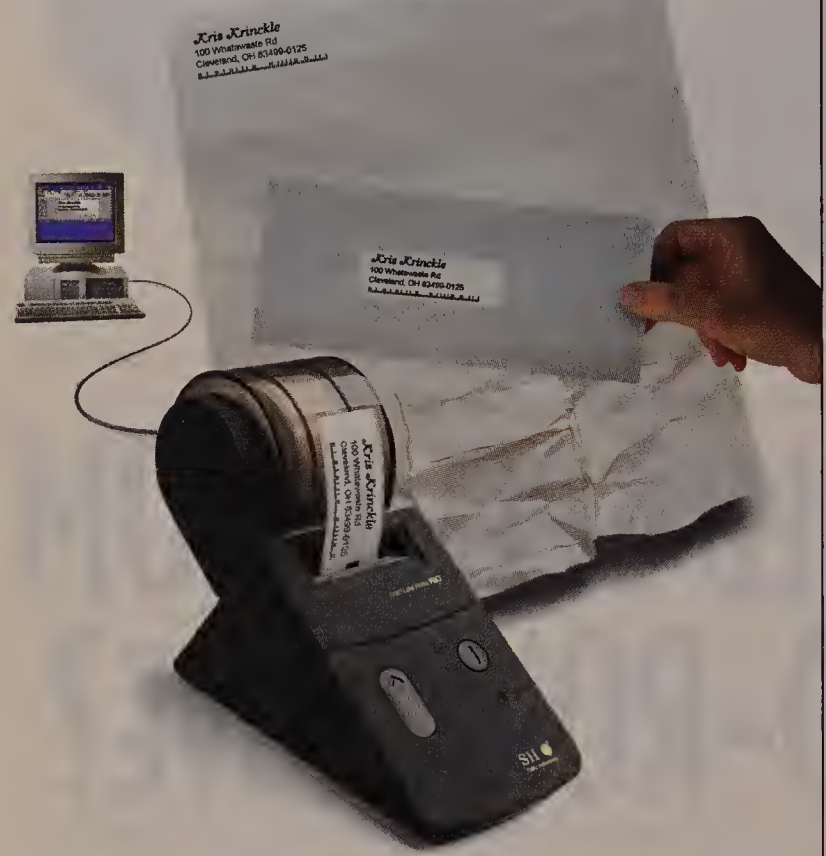
"Can't I Print Just One Label?"



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Circle 188 on reader service card

the scheduler, but these are not fatal flaws. VirusScan NT requires Windows NT 3.51 or later and 4MB of RAM. List price is $65, which includes two years of monthly virus database updates that the company sends via Internet or on disk. McAfee, 408/988-3832.

Reader service no. 737

Plug and Play Storage

Imagine storing 135MB of data on a cartridge slightly larger than a 3.5-inch floppy disk. Syquest Technology's $249.95 EZ135 Parallel Port makes that possible—but what's even better, our installation of a shipping unit took only about 5 minutes. Just plug it into your PC's printer port (you can piggyback your printer) and install the software for DOS, Windows 3.*x*, or Windows 95. We tested with Win 95. The removable cartridges, which cost $20 each (one is included), slip into the 2-pound drive like floppies. Syquest's parallel port units read and write data at almost the speed of a hard disk. A Video for Windows file played fluidly from the EZ135: No hiccups or synchronization delays were noticeable. The device plugs into the parallel port, so it's easy to move it from one PC to another. Syquest Technology, 800/245-2278.

Reader service no. 738

A Different Look for Win 95 Desktop

VirtualDesk is billed as a Windows 95 shell. But doesn't Win 95 render graphical shells obsolete? Yes, mostly. We were not impressed by VirtualDesk, which completely replaces your Windows 95 desktop with an interface that uses on-screen metaphors ranging from a street scene to a home den—much as Microsoft Bob replaces Windows 3.1. A HelpWizard feature helps you customize your desktop. VirtualDesk comes with some basic utilities, such as password tools; it also provides icons for America Online, CompuServe, and Netscape. But the icons are of dubious value—with Win 95 you can put similar icons right on the desktop. Another utility lets you assign an Internet link to a file (for example, a word processing document) so you can click within the document to go directly to a related site. If these capabilities intrigue you, then VirtualDesk is worth a look. But the product seems skimpy to us, given its $49.95 list price. SmartDesk, Inc., 800/582-4022, 714/582-4020.

Reader service no. 739

Help With Bibliographies

Today's feature-packed word processors still haven't much eased the task of creating bibliographies. Enter EndNote Plus 2.1, which we tested in a prerelease version for Windows 95 (a Win 3.1 version is also available). The program greatly simplifies maintaining a list of books and journals and inserting citations within a word-processing document. When you have done writing, EndNote automatically composes the bibliography, formatting it to your specifications. The program works best with Microsoft Word 6.0 and Word 7.0 for Windows 95, since it adds bibliographic commands to Word's own Tools menu; users of Corel WordPerfect and Lotus Ami Pro or Word Pro must run

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QEMM lets you run more programs simultaneously, without those dreaded "out of memory" messages. QEMM's memory multiplier, MagnaRAM (also available separately), uses memory compression to increase the amount of memory available in Windows 95 and Windows 3.1. QEMM's Resource Manager controls Windows 3.1's User and GDI resources intelligently to allow you to load more programs at once.

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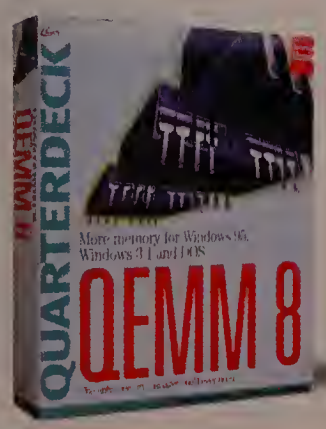
PC MAGAZINE, FEBRUARY 6, 1996

"...MagnaRAM 2 is the first and only utility to successfully tackle memory constraints on PCs running Windows 95."
"Stretch your RAM and open more files under Windows 95."
Verdict: ★★★★
PC COMPUTING, MARCH 1996



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INFOWORLD, NOVEMBER 27, 1995

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EndNote as a stand-alone application. Street price: $179. Niles & Associates, 800/554-3049, 510/559-8592.

Reader service no. 740

A Better OS/2 Desktop

Stardock Systems' new Object Desktop 1.5 for OS/2 Warp adds Internet integration, a significant enhancement over version 1.0. We tested a prerelease copy of version 1.5, which combines the ease of use of the Windows 95 desktop with OS/2's Workplace Shell. You can send e-mail directly from your desktop or browse World Wide Web sites using IBM's Web Explorer browser. You can also package your desktop objects (even your entire desktop) and save them on a floppy as a backup or transfer them to another machine. Other enhancements: an Object Navigator that lets you browse the drives and folders on your PC, and window "roll-ups" that hide all but a window's title bar. The list price is $89.95; the upgrade is $37. Stardock Systems, Inc., 313/453-0328, http://www .stardock.com.

Reader service no. 741

Affordable UPS Units

Deltec Electronics, a maker of uninterruptible power supplies, has unveiled its new PowerRite Max UPS series. We saw a preproduction unit. The Plug and Play models are available in power levels from 450 volt-amperes and 700VA (appropriate for PCs) up to 1500VA (for small network servers). The units safeguard your work and protect PCs, modems, and networks against damage from a power surge or outage. List prices are reasonable, ranging from $299 to $819. Deltec Electronics Corp., 800/854-2658, 619/291-4211, http://www.deltecpower.com.

Reader service no. 742

NOTHING BUT NET: VirtualDesk adds Internet features to your Windows 95 desktop. But overall, we weren't impressed.

For more information about any product, contact the manufacturer or circle the number on the reader service card.

COMING UP

Suite Face-Off, Round Three: Corel WordPerfect Office

The last contender in the Windows 95 suite stakes finally enters the ring. As we compare interface, integration, and individual apps, can Corel kayo Microsoft Office 95 and Lotus SmartSuite?

Good, Cheap Hardware: Where To Get It, What To Look For

Don't have $3000 to shell out for a new Pentium? We've got the best strategies for finding deals—including the scoop on refurbished systems, getting bargains at reseller stores, and leasing versus buying.

6X and 8X CD-ROM Drives: The Right Spin

Tired of slogging through slow software installation and sluggish CD-ROMs? We reviewed 21 CD-ROM drives and found that not all 6X or 8X drives are everything they claim. Plus the latest on DVD.

Also Next Month

- **The PC World Top 20 Power Desktops, Budget Desktops, and Notebooks, Plus the Top 10 Workgroup Printers, Graphics Boards, and Modems**
- **17-Inch Monitors: Eyestrain at your PC? We check out 25 monitors with high-end features for as little as $660.**
- **Word Processing Tips: From keyboard shortcuts to automated formatting, plus HTML tips to turn your word processor into a Web tool.**

PC WORLD

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Windows Magazine 1996 Recommended

"The QP5/150 SM-2 is a brute that will keep the competition on its toes" (May '96).

Computer Shopper

"The most compelling configuration for its price remains the Quantex QP5/166 SM-2" (April '96).

1996 Editors' Choice HOMEPC Top 100 Hardware

"If it's speed you're after, this QP5/100 M-4 Pentium trounces the competition" (April '96).

Newsweek

Special Edition "Computers & the Family" recognized the QP5/75 as one of the "14 Best PCs For the Long Haul."

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"New features... boost this mini-tower near the ›p." (July '96).

PCComputing

"The QP5/150 SM-2's overall performance was higher than that of all 150MHz systems, and it nearly kept pace with the 166MHz Pentium systems" (March '96).

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"Quantex has the performance, value, and multimedia features to do any family proud" (May '96).

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- 256KB Internol L2 Coche
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- Toshibo 6.7X 145ms SCSI CD-ROM Drive
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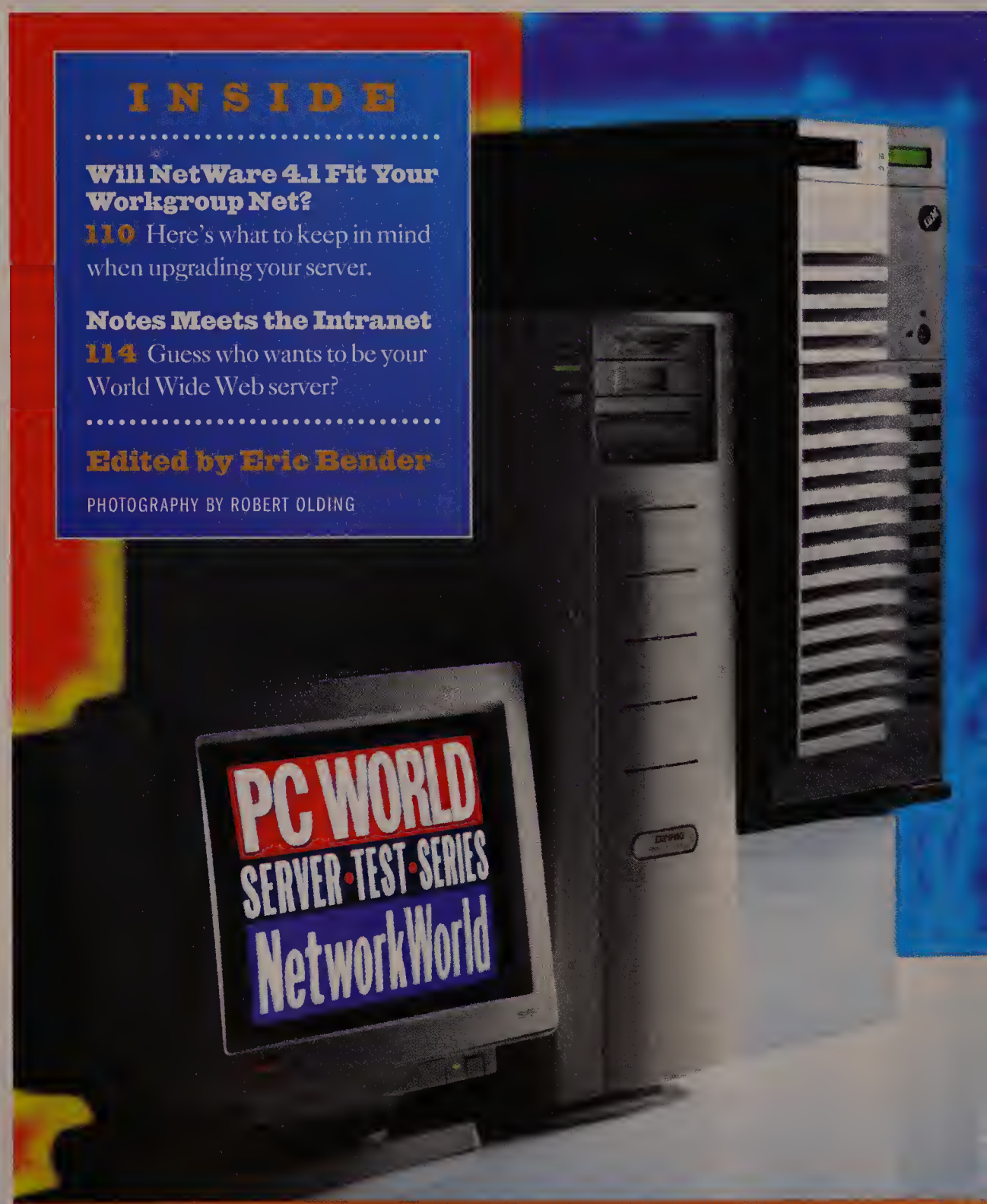
SPECIAL REPORT

Workgroup Computing

Servers Start to Turn Pro

Compaq and IBM top the charts for workgroup and enterprise servers.

By Eric Bender and William L. Rinko-Gay



BEST BUYS IN SERVERS: The Compaq ProLiant 1500 Model 5/133-2100 (left) edges out tough competition as best workgroup server, while the four-processor IBM PC Server 720 becomes our first enterprise winner.

INSIDE

Will NetWare 4.1 Fit Your Workgroup Net?
110 Here's what to keep in mind when upgrading your server.

Notes Meets the Intranet
114 Guess who wants to be your World Wide Web server?

Edited by Eric Bender

PHOTOGRAPHY BY ROBERT OLDING

f you're buying a network server, keep an eye on the Pros—multiprocessor Pentium Pro–based machines. The Pro was born to run full 32-bit operating systems on relatively cheap multiprocessor systems that can go head-to-head with RISC-based designs, and these systems are now hitting the street. There's one reviewed here—ALR's Revolution Quad6 166/512—and it creamed through our database tests 24 percent faster than the second-place finisher.

But you consider more than performance when you buy servers, and the ALR came n third in our first enterprise server oundup. These reviews cover machines nuch more powerful than those in our vorkgroup server roundups—they're deigned with up to four processors (rather han one), at least 64MB of memory (rather han 32MB), more than 5GB of hard disk torage, and four network adapters (rather han one). As with workgroup servers, we ate each enterprise server on a combination of performance, features, pricing, reliability, and service and support.

We're updating both enterprise and workgroup server roundups monthly on PC World Online (http://www.pcworld.com). Check out the site for expanded reviews and for reviews of Best of the Rest servers not covered here, plus details on testing procedures, complete performance results, and other key buying information.

Eric Bender is an executive editor for PC World. *William L. Rinko-Gay directs the Network World–PC World Network Test Center.*

WORKGROUP SERVERS

Compaq ProLiant 1500 Model 5/133-2100

PROS: Excellent performance and software tools

CONS: Premium price

This machine has it all—the best performance we've seen in a workgroup server, good expandability, clean design, hot-swappable drives, and Compaq's leading-edge software installation tools and server management software. You pay for it all, of course—at $8499, the ProLiant costs $2549 more than the runner-up Digital Prioris.

The ProLiant edged the Prioris by 2 percent on our file service tests. In our application benchmarks it beat the Acer AcerAltos 900, which posted the second-best performance, by 9 percent overall.

The ProLiant we tested came with a 133-MHz Pentium (it's upgradable to two CPUs) and two hot-swappable 2.1GB Seagate Barracuda drives. It's a large server and nicely designed. The lockable front cover swings open to provide access to five hot-plug drive bays; these drives are easy to snap in and remove. You also get easy access to all slots, SIMMs, and processor sockets.

Documentation is good. The ProLiant bundles Compaq's excellent SmartStart installation software, and Compaq's Insight Manager helps you spot potential problems and manage the server on your network or remotely. Overall, this is one server that offers everything you need to keep your workgroup net working.

Digital Prioris XL Server 5133

PROS: Very good performance, inexpensive, clean design

CONS: Limited expandability

Digital Equipment Corporation's Prioris XL Server 5133 is engineered well (second only to the Compaq ProLiant in overall performance), bundled with solid software tools, and backed by Digital's worldwide support organization. It's a very good value at $5950.

The Prioris runs just behind the Compaq in almost all tests. The model we tested came with a 133-MHz Pentium (upgradable to dual processors), and two 2GB Seagate Barracuda drives with an excellent Fast & Wide SCSI-2 disk controller from Adaptec. Although fairly big, the minitower doesn't provide as much expansion space as some workgroup servers. You can remove the cover without a screwdriver. Once the cover's off, all parts are easily accessible. Documentation is good, and the QuickLaunch CD-ROM helps you properly install your network operating system. Digital bundles ServerWorks Manager, which keeps tabs on the health of the server, and ManageWorks Workgroup Administrator, which helps you manage an entire network.

HP NetServer 5/133 LH

PROS: Good performance and expandability

CONS: Higher price than some rivals

This former Best Buy workgroup server offers an impressive mix of performance, features, and software tools, but at $7242 its price is no longer aggressive. It comes with a Pentium-133 CPU and four 1.05GB SCSI drives and two integrated disk controllers. On file service tests, the NetServer came in close behind its Compaq and Digital rivals.

The NetServer box is nicely organized, very serviceable, and has little wasted space. Its hard drives are all hot-swappable. It has room for four drives and lots of open slots.

The system comes with a well-stocked CD-ROM installation kit and server management software that works with HP's OpenView network tool. For more information, see our May review ("The Best Workgroup Servers").

Compaq ProSignia 500 Model 5/120-2100

PROS: Well-integrated components, strong software tools

CONS: Only one PCI slot open as tested

The Compaq ProSignia 500 is a capable, thoughtfully designed server that offers a good internal layout, superior documentation, and reasonable price/performance. At a street price of $5539 with 120-MHz Pentium CPU and one 2.1GB drive, it's a good entry-level choice for workgroups. For more information, see our May review.

Dell PowerEdge SP 5133-2

PROS: Good price, good upgrade path

CONS: Mediocre file service performance

We retested the PowerEdge in a different configuration than in our May review, with one rather than two 2.1 GB drives and other

TOP 5 WORKGROUP SERVERS

	Overall rating	Performance rating	Features rating	Street price	CPU	RAM (MB)	Hard drives / individual capacity (GB)	Open I/O slots / open bays	Reader service number	Comments
1 Compaq ProLiant 1500 Model 5/133-2100 800/345-1518	91	91	88	$8499	Pentium-133	32	2/2.1	7/5	808	Excellent performance, clean design, hot-swappable drives.
2 Digital Prioris XL Server 5133 800/722-9332	90	85	86	$5950	Pentium-133	32	2/2	6/4	809	Very good performance, inexpensive, strong software tools.
3 HP NetServer 5/133 LH 800/322-4772	89	81	87	$7242	Pentium-133	32	4/1.05	8/4	810	Good speed (especially on file service) and expandability.
4 Compaq ProSignia 500 Model 5/120-2100 800/345-1518	85	72	79	$5539	Pentium-120	32	1/2.1	4/4	811	Middling performance, but well-designed, capable.
5 Dell PowerEdge SP 5133-2 800/289-3355	84	72	81	$5150	Pentium-133	32	1/2.1	7/4	812	Good pricing and upgrade path, slow file service performance.

BEST BUY

For all ratings, higher is better. For a description of our server tests, see PC World Online (http://www.pcworld.com).

For more information about all products in this table, circle reader service no. 912.

ost-saving changes, and found it to be competitive. This 133-MHz Pentium machine oes well on applications, behind only the roLiant and AcerAltos in our tests, and can ke a second processor, but its file service erformance is still below par—60 percent elow the ProLiant's. Dell has repeatedly ashed server pricing, and with its slimmed-own configuration, the PowerEdge now rries a street price of $5150—and becomes e least expensive server in this roundup. or more information, see our May review.

ENTERPRISE SERVERS

M PC Server 720

OS: Excellent performance and upgradability
NS: CD-ROM drive on its side

you want expandability, IBM's PC Server 20 gives it out in spades. The model we sted, priced at $26,000, came with four 33-MHz Pentium processors (each with 12K of secondary cache), 128MB of mem-y, and 13.5GB of storage (in six 2.25GB uantum Atlas drives). You can get up to six PUs, 1GB of memory, and (with an exter-al storage system) over 100GB of storage.

The IBM came in third on overall perfor-ance behind HP's NetServer 5/166 LS4 d the ALR Revolution but did particular-well on our NetWare tests. It comes with ot-swappable drives, ECC memory, and pport for optional RAID 5 fault-tolerant eration in hardware.

The chassis is laid out well. You can get to 118 drive bays by swinging down the front anel. The CD-ROM drive is mounted deways, which is very clumsy. SIMM ckets are on cards, but you must remove a plastic cage to change SIMMs or processors, and the cage is difficult to reinstall. This machine offers a last bow for the Micro Channel bus, with combined MCA and PCI slots that are easy to access. A label on the side panel helps you configure options. Documentation is good, and the 720 comes with ServerGuide and NetFinity, a server management program that can boss around any PC or server on your net.

HP NetServer 5/166 LS4

PROS: Top performance, good design and software tools
CONS: No free PCI slots as tested

Overall, this NetServer is the fastest network server we've tested to date—even including the four–Pentium Pro ALR Revolution. It's not cheap, at $26,469, but shows no significant weaknesses.

The system we reviewed was built for speed. It held four 166-MHz Pentiums (each with 1MB of secondary cache) on two cards, 128MB of ECC memory (expandable to 768MB), a PCI bus that can run at clock speeds independent of the processor speed, four hot-swappable 2.1GB Seagate Barracuda drives, and two integrated Adaptec SCSI adapters. Like its workgroup kin, the LS4 comes with excellent installation and server management software, and plenty of documentation on CD-ROMs.

ALR Revolution Quad6 166/512

PROS: Blazing database speed, very expandable
CONS: High price, lacks software tools

This four-processor Pentium Pro machine is a great application server, but it suffers from important limitations. It's designed well, outfitted with RAID support and other high-reliability features, extremely expandable, easily serviced—and oh yes, it galloped through our Oracle database application tests in record time. But it costs $32,999, it wasn't a leader in our other performance tests, and it lacks the complete suite of software tools that HP, IBM, and some other vendors provide.

The model we tested arrived with four 166-MHz Pentium Pros, each with 512K of on-chip secondary cache. We tested it with 128MB of ECC memory (expandable to no less than 2GB) and nine 2.15GB Conner drives. The disk controller comes with 8MB of memory and handles three SCSI channels, each handling up to 16 SCSI devices.

This is one mammoth box. (Wheels built into the bottom let you move it around.) An LCD on the front of the system gives feedback on everything from which processors are in use to internal temperatures and status of the ten fans. One front door covers the floppy and CD-ROM bays, another covers the nine bays configured with the optional hot-plug drive cage. The drives are very easy to install and remove. A door on the left side can be taken off to expose processors and bus. A door on the right side allows you to configure drives and hot-plug cages. There are two fully redundant power supplies that accept separate cables.

The Revolution comes with a good start-up guide and comprehensive documentation. It lacks a software installation kit, but does come with server management software and a NetWare-tuning package.

For more information about all products in this article, circle reader service no. 914.

TOP 3 ENTERPRISE SERVERS

	Overall rating	Performance rating	Features rating	Street price	CPU	RAM (MB)	Hard drives / individual capacity (GB)	Open I/O slots / open bays	Reader service number	Comments
1 IBM PC Server 720 800/426-3333	91	88	84	$26,000	4/ Pentium-133	128	6/2.25	7/14	–	Excellent performance and upgradability.
2 HP NetServer 5/166 LS4 800/322-4772	90	90	83	$26,469	4/ Pentium-166	128	4/2.1	6/3	814	Top performance, good design and software tools.
3 ALR Revolution Quad6 166/512 800/444-4257	88	88	84	$32,999	4/Pentium Pro-166	128	9/2.15	9/5	815	Blazing database speed, very expandable, high-reliability features.

BEST BUY

For all ratings, higher is better. For a description of our server tests, see PC World Online (http://www.pcworld.com).

For more information about all products in this table, circle reader service no. 913.

NETWORK OPERATING SYSTEMS

Will NetWare 4.1 Fit Your Workgroup Net?

Novell's server platform has gained new strengths—and some credible rivals.

If you installed your departmental network three or more years ago, odds are good that you chose Novell's NetWare as your network operating system. But if the time has come to upgrade that trusty NetWare server, your choice isn't so clear.

Microsoft's NT Server Version 3.51 has been steadily gaining applications and popular support. IBM is turning heads with Warp Server's quick performance and bundled tools. And compared with your old familiar NetWare 3.*x*, NetWare 4.1 is a very different beast.

Even more strikingly, your server's responsibilities will be going through the roof. In addition to sharing disks and printers, the server may need to host groupware applications, connect to the Internet, handle a corporate intranet, let you dial in to the network from home, or post World Wide Web pages. You'll have to look at all these emerging needs carefully before picking the right server software platform.

Old Strengths Versus New Tricks

NetWare 4.1 is still the king of the hill when it comes to delivering robust yet economical file and print sharing.

This network OS runs well on the less expensive hardware preferred by small workgroups, and it scales gracefully to handle the needs of large companies. (On the high end, it's common to see servers that sport 100GB or more of shared disk space and handle a thousand users at once.)

Windows NT Server and OS/2 Warp Server are getting much closer to NetWare's

Making the Move to NetWare 4.1

"We thought about Windows NT a year ago when the time came to buy an upgrade to a 100-user license," says Scott Advani, computing services manager for Campus Crusade for Christ of Canada. "The price to switch to Windows NT was about the same as the cost of buying the NetWare upgrade."

But the Christian ministry organization, based near Vancouver, British Columbia, decided to stick with NetWare instead. "I wasn't ready to put all our eggs in the basket of Microsoft's relatively new network operating system," Advani explains.

The existing network connected 60 PCs to a single 486-based NetWare 3.11 server. It now includes two Pentium-based NetWare 4.1 servers, the second one added to support eight Macintoshes, but network management has not become a problem, Advani says.

He particularly emphasizes the payoffs from the Novell Directory Services feature (see the figure on the next page). "Its benefit became quite apparent as soon as we added the second server, and it will be a tremendous plus if we place servers in our remote offices. The ability for us to manage our network centrally and for our users to navigate without knowing about servers is what makes NetWare 4.1 worthwhile."

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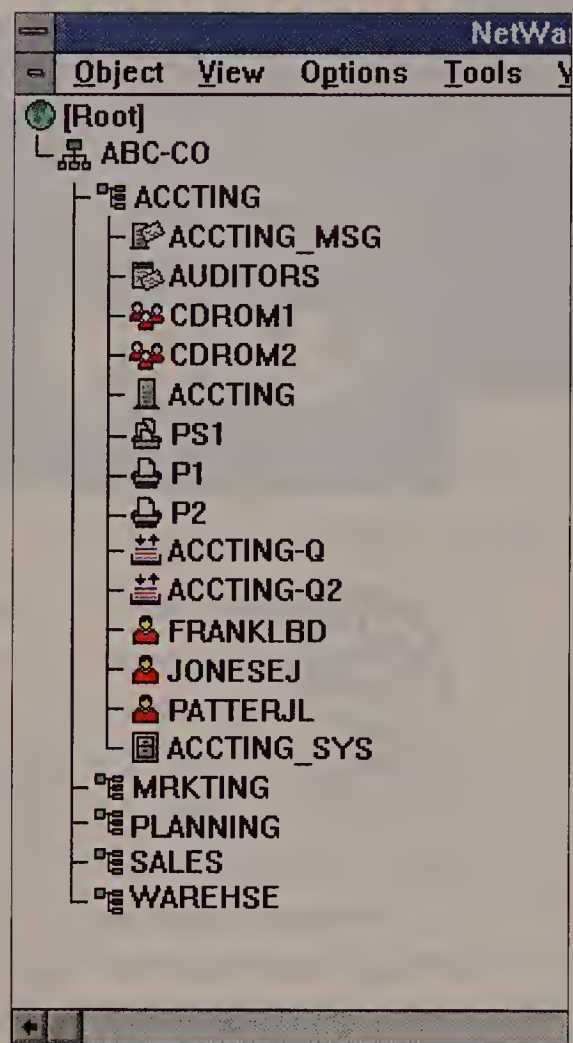

THE NOVELL DIRECTORY SERVICES feature makes it easier to navigate nets by showing resources in an easily browsed "directory tree."

speed, but still can't rival NetWare 4.1's efficiency on low-cost hardware or its high performance under very heavy loads.

But these competitors do outgun NetWare 4.1 when it comes to flexibility and ease of administration.

Both Windows NT Server and Warp Server are friendlier to the network administrator who's charged with installing and managing a server. In contrast to NetWare 4.1, which still shows a plain-text interface, Windows NT Server offers the same graphical user interface as Windows 3.1, and Warp Server provides the same GUI that comes with OS/2 Warp.

Bundled or Bought?

The Windows NT and Warp products come bundled with server-based applications and services that cost extra with NetWare. Both incorporate dial-in modules that enable you to connect modems to your server and dial in to your network from home. Both also come with built-in Web server modules. (At press time Novell was not even sure if it would bundle such programs in the next big NetWare upgrade, dubbed Green River and expected this fall.)

NetWare 4.1 does have excellent built-in communications features. Its Novell Directory Services lets all the NetWare 4.1 servers in your corporation become part of a single security system, which NetWare 4.1 calls a directory tree (see the figure at left). Once you log in to a directory tree, you can navigate all its servers and other resources relatively easily, within the bounds the network administrator has set for you.

Additionally, and in contrast to Windows NT Server and Warp Server, NetWare 4.1 lets the administrator manage the whole network from one point and still let each department control its resources.

And a NetWare 4.1 server generally is the best equipped to connect your network to the outside world. It comes with a built-in ability to join one network to another (or, in networking terminology, to act as a router). Netware 4.1 is so efficient at this task that many corporations use specialized NetWare servers to handle the communications routing for all their internal networks.

Running the Right Applications

Windows NT Server and Warp Server are friendlier environments for running groupware programs, client/server databases, Web and dial-in servers, and other server-based applications. Applications for these network operating systems are generally more numerous (especially for Windows NT) and easier to install and run.

Third-party developers of server-based applications often deliver on Windows NT before NetWare, partly because it's harder to write the NetWare Loadable Module applications. When and if NetWare versions finally appear, they tend to run faster than their counterparts on NT or Warp, but they also tend to be considerably more difficult to install, configure, and maintain.

One NetWare handicap is disappearing: Like NT, it now supports multiprocessor servers. This capability may become more important over time even for workgroup servers, since many now can be upgraded with a second processor to run network applications more quickly.

So which network operating system is best for you? If you seek fast, reliable file and print sharing and a server that fits well into a corporate security strategy, NetWare 4.1 is the best choice. However, if your system must host some of the growing list of server-based applications, then consider switching to Windows NT Server or Warp Server.

- **NetWare 4.1,** list price $3695 (for 25 users); Novell; 800/638-9273

Reader service no. 817

—Bill Lawrence

Bill Lawrence manages network and PC computing for a major Western utility. He is the author of Using NetWare 4.1 and Using NetWare 3.12 *(Que, 1995, 800/428-5331).*

Your server's responsibilities will be going through the roof, so look at those emerging needs before picking your server software.

NetWare 4.1 Pros and Cons

Novell's latest network operating system offers strong capabilities but has drawn some equally strong competitors. Here are some highlights on how it stacks up against Windows NT Server and Warp Server:

PROS

- **Best file and print sharing performance**
- **Optimal for use on inexpensive server hardware**
- **Global directory for common access and security across the network**
- **Good at connecting with other networks**

CONS

- **Weak as an application server**
- **Common server-based applications like modem sharing and World Wide Web service cost extra**

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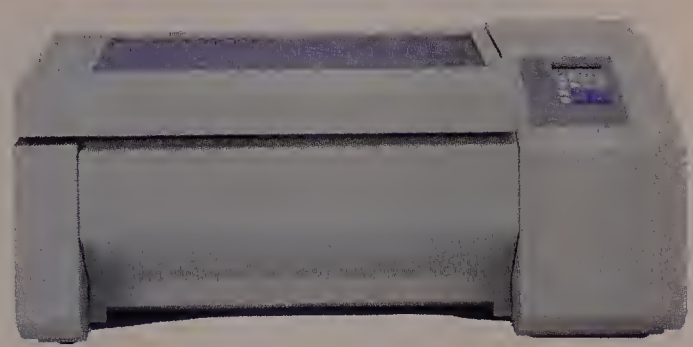

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GROUP APPLICATIONS

Notes Meets the Intranet

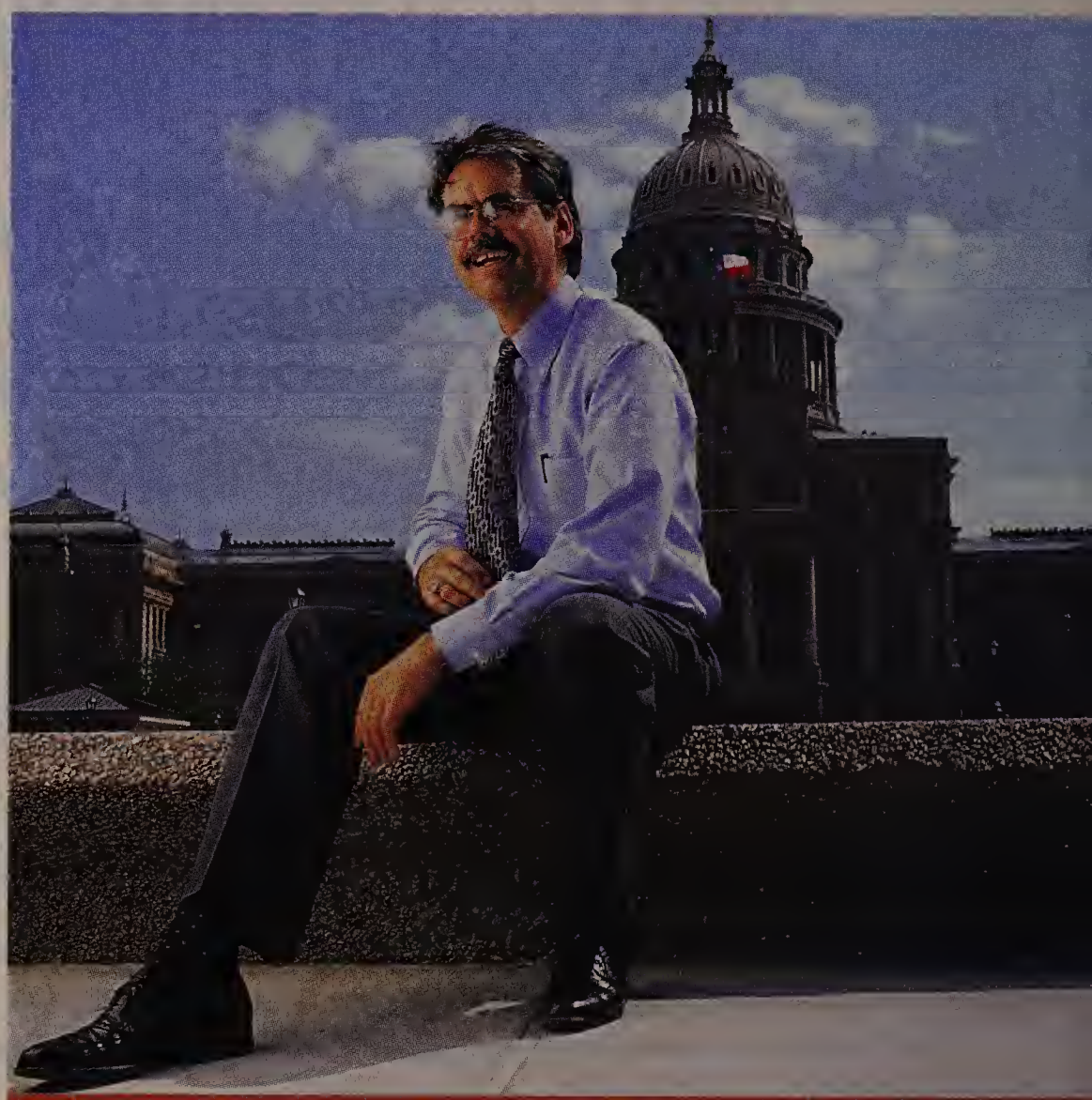
The king of groupware buddies up to the Web.

The world has finally caught up with Lotus Notes. When Notes first arrived in 1989, you had to pony up $62,000 and buy an OS/2 server so that a few dozen users could hold discussions and swap documents online. Potential customers just laughed.

But Windows, pervasive PC networking, electronic mail, and the Internet have all exploded in the past six years—and we're all joining electronic discussions via e-mail and viewing documents on the World Wide Web. The jokes about Notes have stopped, and the folks at Lotus who once worried about explaining why we need Notes now worry about something else: competition.

The big challenge to Notes, however, isn't from Microsoft, Novell, or other software vendors. Instead, it's the Web and the use of Web technology in private intranet networks. With Web server software you can handle many of the tasks once restricted to Notes, often building on an infrastructure already in place. And free Web browsers (so-called universal clients) are easier to use than the Notes client.

Into this tumult comes the fourth generation of Notes, designed to prosper even in environments where e-mail and Internet surfing rule. With version 4.1, Lotus has transformed Notes into the most full-featured e-mail product on the market and has also added capabilities for swapping information on the Web. With a more powerful server engine, easier-to-use development tools, and a pleasantly improved interface, the new Notes is also better at what it has always done best—hosting group applications that keep critical information (in any form) moving to everyone who needs it. Notes' competitors have more catching up to do than ever.



Ready 4 Notes Expansion

The Texas Comptroller of Public Accounts collects taxes for the state of Texas. The agency also taxes the abilities of Notes 3, boasting 730 Notes users and four busy Notes servers. "We have about 50 databases and are adding about one database per week," says technology analyst Chris Guinn, who's eager to upgrade to Notes 4.

Notes supports the cross-functional project teams that tackle special assignments. "It's ideal for automating an ad hoc team," says Guinn. "Notes is a natural place to dump ideas and document the team's efforts, and to keep team members in touch."

The agency also uses the InterNotes Web Publisher to create an Intranet, publishing about 20 Notes databases to another 1400 users who have Web browsers but not Notes. "Our intranet provides another tier of Notes access," says Guinn, who doesn't agree with claims that Web technology will kill Notes. "You don't have to use one or the other. They work well together."

Guinn likes Notes 4's new graphical interface, which will make it easier to marry existing Notes applications to his intranet. "I'm looking forward to creating graphical navigators, then having the Web Publisher translate those into image maps on our Web pages." Guinn also likes Notes 4's enhanced server performance. "With Notes 3, if a server is replicating and indexing databases at the same time, it slows to a crawl."

What won't crawl is the agency's switch to Notes. Says Guinn, "Once we start our migration to Notes 4, it will be quick."

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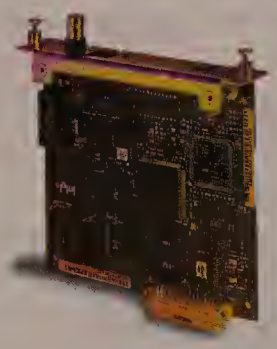

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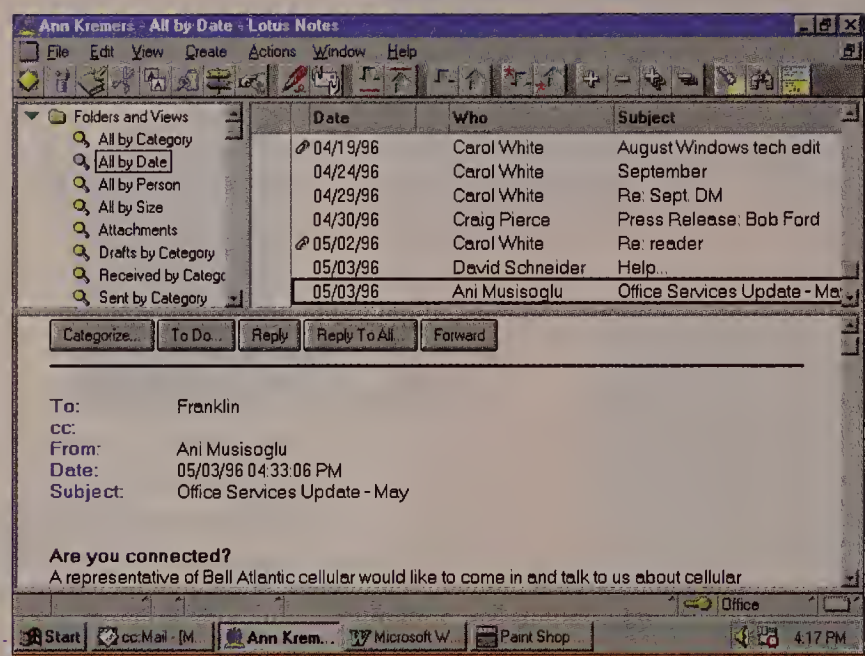


NOTES MAIL'S new three-paned window, built-in workflow, and on-the-fly sorting put it in the same league as cc:Mail and Microsoft Mail. You can license Notes Mail as a separate component for those who only need e-mail.

Better and Cheaper E-Mail

It's always been possible to use Notes as an e-mail platform, but its lackluster interface was easily eclipsed by dedicated e-mail packages like Lotus's own cc:Mail and Microsoft Mail. Notes 4.1's new three-paned window (see the figure above) and its ability to sort messages on the fly put it at the front of the pack. Notes Mail now lets you create messages that route a document or a form sequentially to a list of recipients, or send confidential messages that can't be saved, forwarded, or copied to the Clipboard.

You can license Notes Mail as a separate component for about $55 per user. You buy the Notes Desktop ($69 per user) for those who need to access all Notes applications, and you buy Full Notes ($275 per user) for those few who need to develop applications. Even the server software is reasonably priced at $495 for a single-processor server. Notes 4.1 supports Windows 3.*x*, 95, and NT, and OS/2 (including Warp), UNIX, and Macintosh clients; and Windows 95 and NT, OS/2, UNIX, and NetWare servers.

Notes 4.1 Web Publishing

Notes forges fairly seamless links to the Web thanks to two bundled tools: InterNotes Web Publisher 4.0 and InterNotes Web Navigator. The Web Publisher translates Notes documents to HTML format so that anyone with a browser (even users without Notes) can read them. Web surfers can fill out forms, update databases, and scan documents with Notes' search engine.

Notes-generated pages are springing up all over the Web. Vice President Al Gore's National Performance Review site (shown below) demonstrates Notes' organizational skills. ComputerLand in Wichita Falls, Texas, keeps its product listings and price data in a Notes database that's translated on the fly to HTML documents so that hourly updates are instantly reflected on the Web. A student at Arizona State University uses a Notes-generated Web form to collect survey data for her master's thesis and store it in a Notes database.

With the InterNotes Web Navigator, you can browse documents on the Web without leaving Notes and add Web links to any Notes document. The Notes server plucks the pages from the Web, translates them into Notes format, and makes them available to all Notes users as doc links.

More Panes, More Gains

The new multipaned look of Notes Mail has also found its way into other Notes databases. When you open a database, its list of documents appears in one pane and a list of views appears in the other. You can turn the view pane into a graphical navigator that displays an icon for each view.

Instead of using Notes' unfriendly macro language to automate common tasks, you can easily create agents that you activate with a mouse click. In Notes Mail, for example, you can invoke an agent to archive and delete messages over 60 days old. You can run agents manually or configure them to run automatically on a schedule you set. Notes 4.1 comes with many prebuilt sample applications—including a budget planner, a contact manager, and a document tracker—with useful agents that you can incorporate into your own applications. For more advanced programming, there's LotusScript 3.0, a language like Microsoft's Visual Basic.

Administering Notes has never been easy; Notes 4.1 tackles this problem head-on. One key is supporting more users on each Notes server. According to Lotus, high-end, multiprocessor servers can handle 500 to 1000 concurrent users.

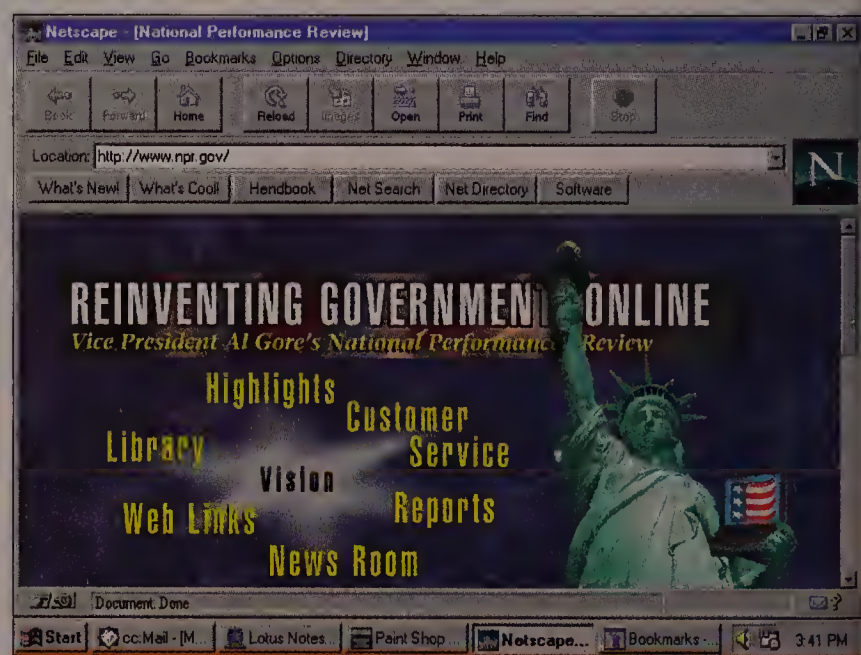
Similarly, Notes' consolidation of all intranet and Internet tasks in one platform gives it the advantage over cheaper Web tools. To match the functionality of Notes, you'd have to buy several Web products from different vendors, then get them all to work together. That can cost more than Notes. For the large intranet, Notes' comprehensive solution is still the best buy.

• **Notes 4.1 clients** (all prices per user): **Notes Mail** $55; **Notes Desktop,** run-time version $69; **Full Notes** $275. **Notes servers:** single processor system $495, multiple-processor system $2295; Lotus Development Corporation; 800/346-1305.

Reader service no. 816

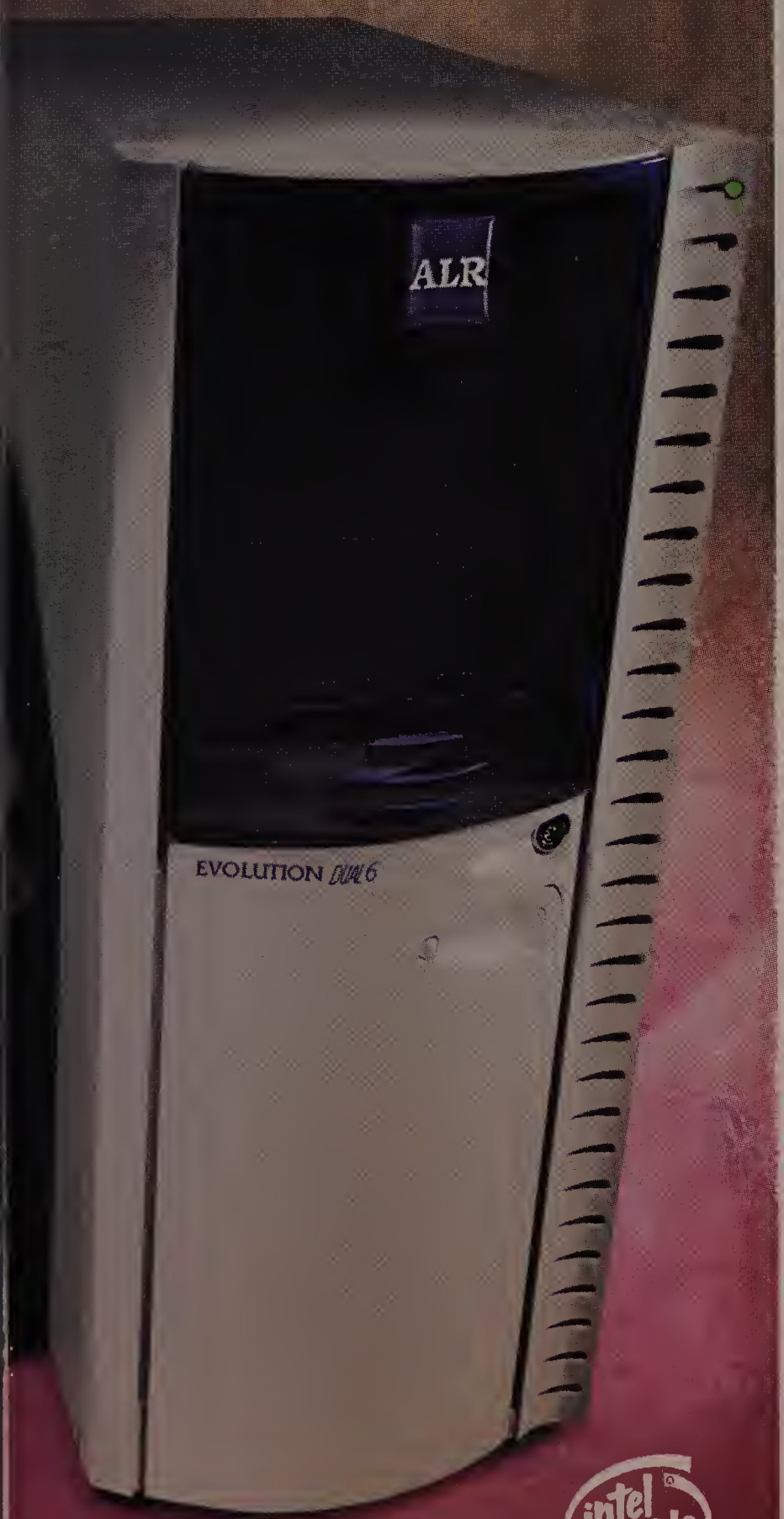
—Bill Lawrence

Bill Lawrence manages network and PC computing for a major Western utility.



NOTES ON THE WEB: You can't tell by looking, but this Web page has been created and maintained by Notes, which offers very strong tools for managing large sets of documents.

Dual Pentium® Pro Technology The Right Choice.



You've got deadlines to meet, projects to finish, the success of your business riding on your shoulders. You are a business professional. So why expect anything less of your computer? Especially when you can afford an **ALR Evolution Dual 6.**

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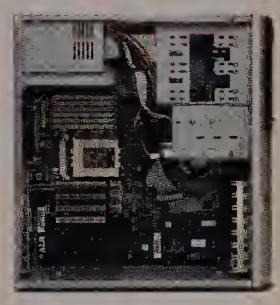

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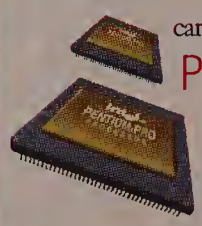

Try doing that with one of our competitors' systems.

While you're at it, try comparing warranties. You'll find that the ALR Evolution Dual6's 5 Year/36 Month warranty leads the industry.

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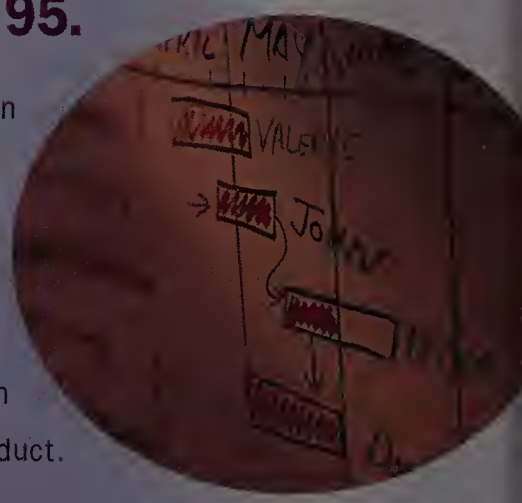
Circle 13 on reader service card

to guide
your project down a clear path

Microsoft Project for Windows 95.



Now you can manage projects more simply, more smoothly, by communicating project information as it occurs. With Microsoft® Project you can convey project status quickly and effectively so your boss, customers, and coworkers are always in the loop. From sharing task deadlines and responsibilities, to letting people know about changes and the impact they'll have on the deadline, you have the tools to organize your projects into manageable steps and keep them moving in the right direction. Microsoft Project unlocks the doors of communication and gives you the power to navigate the most efficient route to a successful end product.

Graphical views let teammates visualize where the project is going.

With Microsoft Project you can display project data in ways that everyone can understand. Great-looking Gantt Charts integrate text, timelines and graphical bars so everyone can see start and finish dates, interdependencies and task assignments. Throughout your project, you can also use a Monthly Calendar report to share your plan in a format that's clear and easy to read. And since Microsoft Project shares many of the same key commands with other Office applications, it will be easy to create schedules and reports. But if at any time you need help, type in a question and the Answer Wizard gives you the information you need. Microsoft Project helps you illustrate every phase of your project so you and your team keep your goals in sight.

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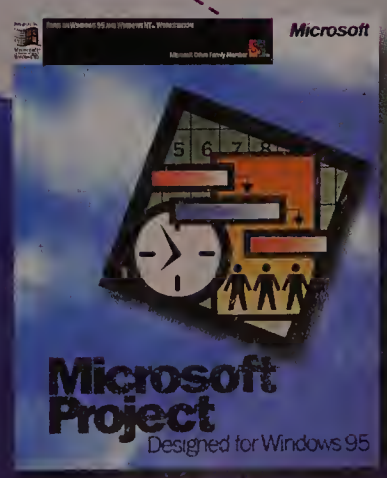
Keep everyone moving on the same track with open lines of communication.

Microsoft Project is completely integrated with a wide range of e-mail systems* and Schedule+ so that with a single click, changes and additions are immediately distributed to and from teammates. Assignments, task changes, and progress can be communicated and updated without ever reentering information, so you save time and eliminate mistakes. And because Microsoft Project is a member of the Office family, sharing data between programs is easy. For example, you can start building a schedule by simply dragging a task list out of Microsoft Excel and dropping it directly into your Microsoft Project plan. You keep communication clear and information consistent and your project continues to move exactly the way you planned.



Now you can take full advantage of Windows 95.

Microsoft Project is the world's best selling project management software and now is optimized to work hand-in-hand with the 32-bit performance, advanced multitasking, and simplified user interface of the Windows® 95 operating system. Together, they help open the lines of communication. Together, they help you enhance the way you manage your projects.

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Internet

SURVIVAL GUIDE

Feeling lost in this brave new electronic world that is the Internet? You're not alone. Things change so quickly, it's hard to know if you're getting the best value for your time and money. For instance, which is the better browser: Netscape's Navigator or Microsoft's Internet Explorer? Are you missing out by subscribing to CompuServe and not some other online service, or vice versa? These days, accessing some Web sites is painfully slow, even with a 28.8-kbps modem. Is it time to invest in a fast new ISDN modem?

To help you answer these questions and more, we've put together our own Internet field guide. First, "42 Tips for Taming Cyberspace" will help you get the most out of using the Net, America Online, CompuServe, and Prodigy. You'll find advice on everything from handling unwieldy URLs to reducing your online bills.

Then, in "Best Web Browser," we tell you why the selection of serious browsers has shrunk from over a dozen coulda-beens to just two steamrollers—Navigator and Internet Explorer—and which of them makes it easier to tour the Internet.

Shopping for an online service? In "Best Online Services" we review the three biggest: America Online, CompuServe, and Prodigy. Each is crammed with more information and communication tools than ever, including Internet access. We tell you which is best for business and leisure.

ISDN modems can download a big Web site graphic in seconds and let you communicate with a remote network faster. But these 128-kbps devices may not be for you. ISDN hasn't gotten any easier to set up, and it's not widespread enough yet to be a good choice for accessing the Internet. See "Best ISDN Modems," our review of eight internal and external ISDN modems.

Finally, have you wondered if what you or somebody else is doing online is legal? Whether you spend most of your time in AOL chat rooms or have just launched your first Web site, it pays to be aware of your rights and those of others. In "What You Can and Can't Get Away With Online," we help you avoid cyberspace's legal land mines with timely advice on copyright law, electronic harassment, and libel.

It's doubtful any of us will ever completely tame the Internet. New services and new applications are added every day—not to mention new problems, such as software incompatibilities and e-mail overloads. But it's fun trying, isn't it?

ILLUSTRATIONS: GLENN MITSUI; PHOTO ILLUSTRATIONS: GEOFF SPEAR

42 TIPS for

TAMING CYBER

A nethead was heard once to whine,
"I have spent my whole fortune online.
So I finally got hip
From a PC World *tip.*
I'm still wired but everything's fine."

The online world can be a great place to do research, keep in touch, and have fun. But if you don't know how to use it, it's a vast sinkhole that steals your time and money and returns only frustration.

We've come up with a collection of tips on getting the most out of the Internet and the major online services. We'll show you how to keep online costs down, quickly find a company's home page, use your favorite browser on the World Wide Web, and get back online when your modem keeps knocking you off. Because going online is a lot trickier than writing a limerick.

WORLD WIDE WEB

1 Better Navigator With Internet Explorer
For the Windows 95 version of Netscape's Navigator to automatically dial up your Internet connection or launch itself from the Run box (click Win 95's *Start* but-

SPACE

How to save time and money on the Internet, America Online, CompuServe, and Prodigy

ton, select *Run*, and type in a URL), you must have Microsoft's Internet Explorer installed. Since Internet Explorer is free and you don't have to use it if you don't want to, all you'll lose is a little hard disk space.

You'll find an installable version of Internet Explorer at http://www.microsoft.com/ie/msie.htm. The installation process makes Internet Explorer your default browser, but the next time you launch Navigator you'll have an opportunity to correct this.

2 Desktop URLs

You can easily put Shortcuts to Web sites on your desktop. In **Navigator**, right-click any spot on the page that isn't a link, and select *Internet Shortcut*. A dialog box will let you enter a Shortcut name. Press **<Enter>**, and the Shortcut appears on your desktop.

With Microsoft's **Internet Explorer**, right-click a spot on the page and select *Create Shortcut* to place the link on your desktop. Or drag a link pointing to the desired page outside of Explorer and onto your desktop.

3 Mouseless URLs

If your hands are already on the keyboard, why switch to the mouse to click the URL box and then go back to the keyboard to enter a URL? In **Navigator**, the key combination **<Ctrl>-L** brings up a dialog box for entering a URL. In **Internet Explorer**, the key combination is **<Ctrl>-O**.

4 Type Shorter Names

You may not have to type the whole URL. In **Navigator** 2.0 or later, if you type a single word—pcworld, for example—as your URL, the program will add the prefix http://www. and the suffix .com. Of course, if the URL has a less common prefix or suffix, you will have to type that, too.

In **Internet Explorer** 2.0 or later, you still have to type the www. and .com, but you can skip the http://.

5 Save Where You Want to in Navigator

By default, when you save pages to your hard disk, Navigator puts them in its own program folder—a really stupid place for them to go. To change the default, right-click your Navigator Shortcut on the Windows 95 desktop, select *Properties*, and go to the *Shortcut* tab. In the 'Start in' field, enter the path and name of the folder you want the files to go into (for instance, **c:\download**).

6 A Good Guess at a URL

Want to find a company's site but don't have its URL? Try **http://www.*companyname*.com**, where *companyname* is the company's one-word name (you may be able to type less; see tip 4, "Type Shorter Names"). For instance, PC World Online is at http://www.pcworld.com. There's a good chance you'll find what you're looking for, and the worst you'll get is an error message.

7 Step Up a Level or Two

If you're having trouble logging on to a page with a long URL, like http://www.arachnids.com/extracts/oils/cooking, or if you're on such a page and want to know just who put it there, try deleting everything in the URL after the .com (or .edu, .net, .org, .gov, or whatever). That will probably bring you to the culprit's home page.

8 Directory or Search Tool

There are two common tools for hunting down a particular subject on the Internet: directories and search engines.

Directories, such as Yahoo (http://www.yahoo.com) and Infoseek (http://www.infoseek.com), let you explore categories and subcategories until you find something interesting. For instance, you might select *Arts and Entertainment* and from there go to *Movies*, and then to *Japanese Films*. It's a great way to explore a general topic. When a site is listed in a directory, someone has actually looked at the site and decided what categories it belongs in.

On the other hand, you should use a search engine, such as AltaVista (http://altavista

BY JUDY HEIM, ANN KREMERS, MICHAEL S. LASKY, AND LINCOLN SPECTOR

.digital.com) or Open Text (http://www.opentext.com), to find Web sites containing one or more particular words or phrases. For instance, if you know you're looking for sites about the Japanese film director Akira Kurosawa, you can search for his name. But you'll get sites that mention Kurosawa in passing as well as sites devoted to him.

The differences between directories and search engines aren't clear-cut—and most Internet directories have search engines of their own. But they're usually not as thorough as the dedicated search engine sites.

9 Choose Your Own Home

Most browsers offer a default home page—the page you go to when you launch the program or click the Home icon—that's filled with ads for the company that makes the browser. But you can set another site as your home page.

In **Navigator**, select *Options • General Preferences*. In the *Appearance* sheet, to the right of the Start With label, click *Home Page Location*. In the text field below, enter the URL of your choice.

In **Internet Explorer**, go to your desired home page, select *View • Options*, click the *Start and Search Pages* tab, make sure that 'Your' *Start Page* is currently selected at the top of the dialog box, click the *Use Current* button, and click *OK*.

10 Start Without a Home in Navigator

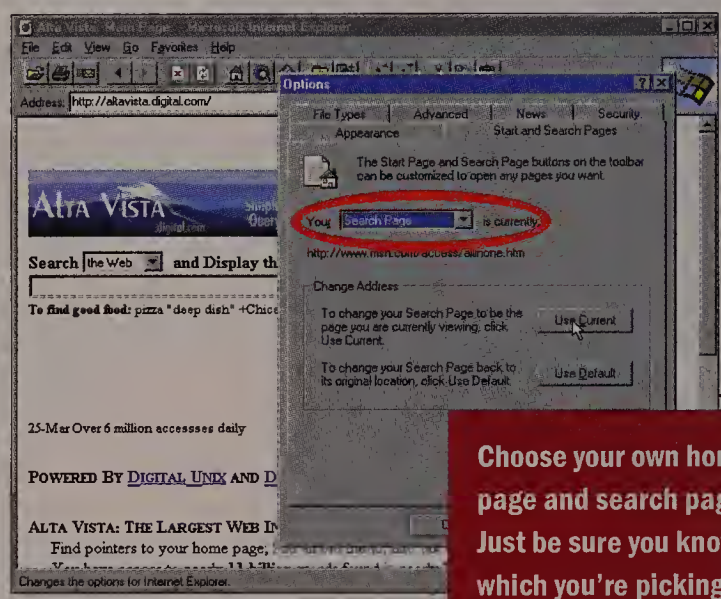
Opening to a blank slate will get you into your browser more quickly. In Navigator, select *Options • General Preferences*, click the *Appearance* tab, and in the Start With section, click *Blank Page*. Navigator will still load the URL of your home page into the Location line, but it won't try to make contact. Just press **<Enter>** or click the *Home* icon to open the page.

11 Setting a Search Page in Internet Explorer

In addition to a default home page, Internet Explorer allows you to set a default search page that you can access from an icon. Go to your favorite search page, select *View • Options*, click the *Start and Search Pages* tab, select 'Your' *Search Page* at the top of the dialog box, click the *Use Current* button, and click *OK*. To go to your search page, click the *Search* icon.

12 Fast Screens With Text, Part 1

Tired of waiting for complex graphics to pump through your modem and paint themselves on your screen? As soon as the page starts to appear, speed up the processing by clicking your browser's *Stop* button or pressing **<Esc>**. (Don't do this *before* the page starts to appear, or you won't get the new page at all.) The text—and nothing but the text—will pop up quickly.



Choose your own home page and search page. Just be sure you know which you're picking. See tip 9, "Choose Your Own Home," and tip 11, "Setting a Search Page in Internet Explorer."

13 Fast Screens With Text, Part 2

If you're clicking that *Stop* button a lot, make text-only loading your default. In **Navigator**, select *Options • Auto Load Images*; the check mark by the option should disappear. Navigator will still load pictures that are already in its cache (they don't slow it down much) but it won't download any over the modem. In **Internet Explorer**, select *View • Options*, click the *Appearance* tab, and turn off the *Show Pictures*, *Play Sounds*, and *Show Animations* options.

14 Add Images Later

Sometimes, after loading just a page's text (see tips 12 and 13, "Fast Screens With Text"), you may decide you want to see a graphic after all. In **Navigator**, right-click the icon in the image's place and select *Load this Image*. In **Internet Explorer**, right-click the icon and select *Show Picture*.

First Hurdle: Getting Connected

22 The Right Hardware

To make sure your 28.8-kbps modem is connecting at top speed and with few data errors, you need a 16550, 16550A, or 16550AN UART chip. Internal modems come with their own UART chip; external ones use the UART in your computer's serial port. (One warning: Many internal modems boast a "simulated" or "virtual" 16550 chip. That's not the same as the real thing, and it may cause data loss at high speed.)

To find out what type of UART chip you have, in Windows 95 click *Start* and select *Settings • Control Panel*. Double-click the *Modems* icon. Click the *Diagnostics* tab, select the communications port where your modem is installed, then click *More Info*.

To get the same information in Windows 3.x, exit Windows and type the command msd at the DOS prompt. At the Microsoft Diagnostics opening screen, click *COM Ports*.

If you lack a 16550 chip, consider upgrading your hardware. If you have an external modem, it's easiest to buy an I/O card with a good UART for about $40 to $60. (You can buy the chip itself for about $15 and insert it into your current board, but that's not for the faint of heart.) If you have an internal modem without a 16550, replace it with a better one.

23 At the Fastest Speed

To make full use of your modem's data compression, set your software to talk to the modem at a higher speed than the modem talks to the phone line. For instance, a 28.8-kbps modem works fastest if it talks to its software at 57.6 kbps.

Any Windows 95 applications you're using are probably already set at the correct speed. To check, go to Control Panel's *Modems* applet, click the *Properties* button, and make sure you're at the *General* tab. Any changes you make will affect all Win 95 programs that use the modem. You'll have to set the speed for DOS and Windows 3.x applications on your own, even if you're using them in Windows 95.

15 Read and Write Mail Offline

To help keep online expenses down, use AOL's built-in FlashSessions feature to log on, upload any mail you've just written, download incoming mail, and disconnect quickly. To set FlashSessions, select *Mail•FlashSessions* and follow the prompts. You can schedule FlashSessions for certain times of day or run them manually.

To get an idea of how FlashSessions work, select *Mail•Compose Mail* and write someone a letter. When you're done, click the *Send Later* button. Then select *Mail•Activate FlashSession Now.*

16 Save Your AOL Session in a Log File

Instead of reading long articles and message board postings online, set up a log file to save them automatically, then read the log offline. Select *File•Logging*, click *Open* in the Session Log section of the resulting dialog box, enter a file name, and click *OK*. While you're cruising around AOL, any text item you open will be saved into the log. Before you exit AOL, select *File•Logging* and click *Close*. The log is a text file you can open in Notepad, QuickView, or any word processor.

17 Don't Pay for Help

You won't want to read AOL's Help, which is on your local hard drive, while racking up online charges. If you need to read it while you're connected, first go to the free Member Services area (select *Members•Member Services*). You won't be charged for any time you spend there, so you can read Help on AOL's time instead of your own.

18 Get Time Credits for Bad Connections

AOL will credit your account for time you lose because of interrupted downloads, corrupted files, system slowdowns, and the host's failure to respond, as well as for billing errors. Use the keyword credit to report your loss.

AOL doesn't look as nice when it's set to display 16-color graphics, but it moves a lot faster. See tip 19, "Reduce Art Download Times."

19 Reduce Art Download Times

Every time you go to a new location on AOL, you have to wait while graphics are downloaded to your computer. You can't completely avoid these annoying downloads, but you can reduce the time you spend waiting for them by turning off some of the superfluous cutesy pictures and reducing the quality of others. Select *Members•Personal Choices*, click the *Multimedia Preferences* icon, then click the *Off* button. While you're there, click *Other Graphic Options*, click the *Graphics* icon, click *Set Color Mode*, and click *16 colors*. Then exit and reenter AOL.

20 Bypass AOL's Web Home Page

If you'd rather bypass America Online's home page when you enter the World Wide Web in AOL 2.5, add your own choice for a home page to your Favorite Places list. Click the *Favorite Places* icon, click *Add Favorite Place* in the resulting dialog box, then enter a name and the URL of the page you want. Now, whenever you want to get on the Web, just click the *Favorite Places* icon to go to your page.

21 Use Navigator Instead of AOL's Default Browser

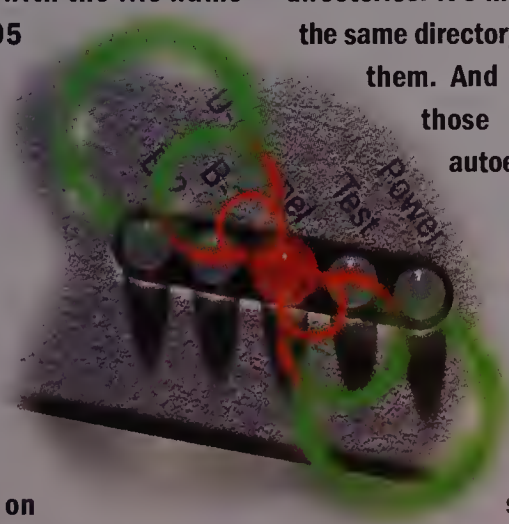
America Online comes with its own browser, but if you've got AOL 2.5, you can also use the popular Netscape Navigator. However, you must use the Windows 3.1 version, even if you have Windows 95. To set it up, use the keyword netscape and download both Navigator and AOL's special version of winsock.dll. You'll also find separate detailed instructions for installing Navigator for Windows 3.1 and Windows 95. Follow them carefully. This process may become much simpler with AOL 3.0.

24 Avoid Winsock Conflicts

Ever get a message like 'Can't find winsock'? A *winsock*, or Windows socket, is a small program that connects you to the Net. Many communications programs have their own winsock—usually with the file name winsock.dll. Windows 95 has one. So does WinCIM. They're not always compatible with each other, and if you have more than one, your programs may be using the wrong one.

To keep your communications applications from getting confused about whose winsock is on first, close down one comm tool before using another. For instance, WinCIM's winsock conflicts with the one for Windows 95's Dial-Up Networking. Thus, if you use both you must close down any program that directly accesses the Internet—browser, e-mail, FTP software—before you dial CompuServe.

If at all possible, keep any versions of winsock that didn't come with Windows out of your c:\windows and c:\windows\system directories. It's much better to put them in the same directory as the program that uses them. And make sure that none of those directories are in your autoexec.bat's path statement.



25 If at First You Don't Succeed...

It's all too common that a log-on that worked an hour ago fails to connect. Why? The online services and ISPs have more business than they can handle. The only things you can do are curse, try again later, complain to customer service—and if it happens too often, take your business elsewhere.

COMPUSERVE

26 Read and Write Mail Offline

Keep online costs down by reading and writing your mail offline. It's easy to do if you're using WinCIM. When you've finished writing a message offline, click *Out-Basket*, then select *Mail•Send/Receive All Mail*. WinCIM will log on to CompuServe, upload your outgoing mail, download any incoming mail to your in-box, and get back offline in a hurry.

27 Find What You're Looking For, Part 1

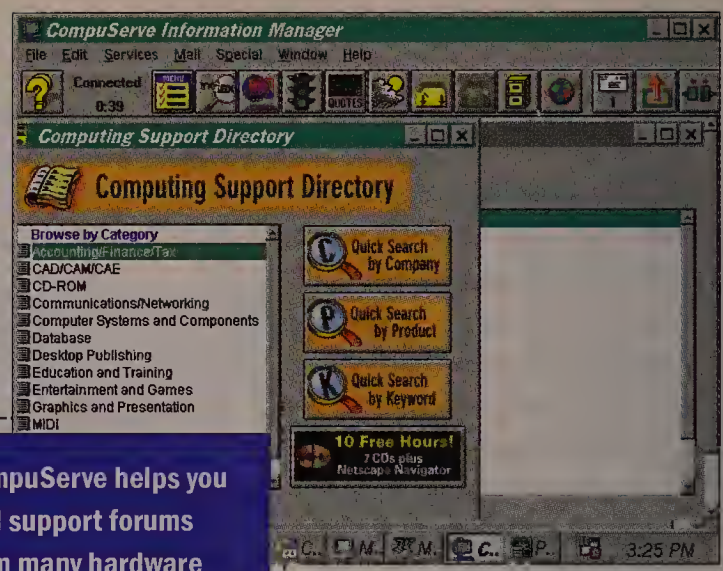
To find forums on a subject that interests you, click WinCIM 2.*x*'s *Find* icon, type in the topic of your choice, and press **<Enter>**. You'll get a listing of forums related to your area of interest. This is a very quick and easy search, but it has one major flaw: You have to do it online, where costs are always adding up.

28 Find What You're Looking For, Part 2

The best way to find a forum is with the CompuServe Forum Index by VBrainStorm Software. This freeware program will tell you not only how to get to CompuServe forums, but also what message areas and libraries you'll find when you get there. It's easy and it works offline. Look for the file cis4um.zip on PC World Online.

29 Speed Up WinCIM Log-Ons

If you don't use CompuServe to access the Internet, you can speed up log-ons by disabling WinCIM 2.*x*'s winsock. Select *Special•Session Settings*. Uncheck the *Use Winsock* option and click *OK*.



CompuServe helps you find support forums from many hardware and software vendors. See tip 30, "The Quickest Way to Computer Support."

30 The Quickest Way to Computer Support

Go to support for a large index of computer hardware and software support areas. You can search it by vendor, topic, or product name.

31 Go World Wide Web

You can get to a Web page by simply clicking the *Go* icon and typing in the appropriate URL. This works only in

When You Can't Get Online

What do you do when you get an error message instead of a connection? Or when you simply get nothing at all? Here are some guidelines to help you figure out what's gone wrong when you can't get online.

No Connection

If your modem doesn't pick up the phone and dial a number, and if no one is talking on the extension, check to make sure the modem and software are configured to use the same communications port. That's the usual reason that modems fail to open the phone line.

If everyone agrees on the port and you're still not getting through, shut down any other communications programs you have running. Some comm programs hog the port, keeping others from getting access. If that doesn't work, try rebooting your computer.

Of course, you may have a hardware problem. This is easy to check: Use a different communications program and see if you have the same trouble.

If your modem connects but then quickly disconnects, your software may not be configured properly. For instance, your America Online setup may specify SprintNet while your access number uses AOLNet.

Figuring Out Error Messages

When you get an error message, you need to know where it came from. Your PC? Your communications software? Your online service or ISP? The Internet? Once you know who's complaining, you're most of the way toward fixing the problem.

Error messages referring to a 'winsock'. Either your software can't find the file winsock.dll, or there are too many versions of that file floating around. See tip 24, "Avoid Winsock Conflicts," for details.

Error messages reporting a 'General write protection' failure. This means a software program bit the big one while running under Windows. The best thing to do is close everything and reboot.

Error messages reporting 'timed out'. If you get this type of message while connected to the Internet, your software gave up waiting for a remote computer to respond. A number of problems can cause the remote computer's failure; it may be busy, or it may no longer be in existence. Log off and try accessing it again.

Where to Go for Help

When you can't solve a problem, don't hesitate to ask other users for help. If you can get connected to your online service, go to its free technical support forum. There you'll find plenty of users helping users, sometimes with input from the service's own technical support staff. If you're having a problem, other people probably are too, and chances are they've already posted messages about it. If you post a question yourself, be sure to send it to the proper forum or message area to get a quick response, and always address it to the forum's sysop.

If you can't get online at all, phone the service's tech support. Be prepared to discuss all the issues raised here, plus give specifics about your PC's and modem's configurations.

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WinCIM 2.*x* with the Use Winsock option on (see tip 29, "Speed Up WinCIM Log-Ons").

32 Using Navigator With WinCIM

If you prefer Netscape's Navigator browser to CompuServe's Mosaic, you can use it with WinCIM 2.0 or later. However, you must use the Windows 3.1 version of Navigator even if you have Windows 95. You'll find the browser at Netscape's Web site (http://www.netscape.com).

Once you've installed Navigator, all you need to do is launch it while online with CompuServe. If you're not running WinCIM at the moment, launch the CompuServe Dialer and click the *Dial* icon. Then once you're online, launch Navigator.

33 Launching Navigator From WinCIM

If you're using Netscape Navigator with WinCIM (see tip 32, "Using Navigator With WinCIM"), you can replace the Mosaic icon on WinCIM's ribbon bar with one that will launch Navigator.

Select *Special•Preferences•Ribbon*. From the Icon pick list, choose an icon that appeals to you. From the Activities pick list, select *Run*. Click the *Mosaic* icon and then click *OK*.

The first time you use this option, WinCIM will ask you which program to start. Point it to *netscape.exe*. The next time you log on, WinCIM will know where to go.

34 Don't Pay for Downloading Duds

Botched file downloads are a fact of life in the bit stream. But you don't have to pay for a bad download or file. When it happens, make a note of the forum where you downloaded the file, the date and time of the download, and the name of the file.

To send CompuServe's customer service department an e-mail message, go to feedback, click the *Proceed* button, and select *Write to Customer Service•Billing Questions•Other*. Include all the information noted above, as well as the access number you used to call CompuServe, your modem speed, and the software you were using. CompuServe will credit your account for the time you lost.

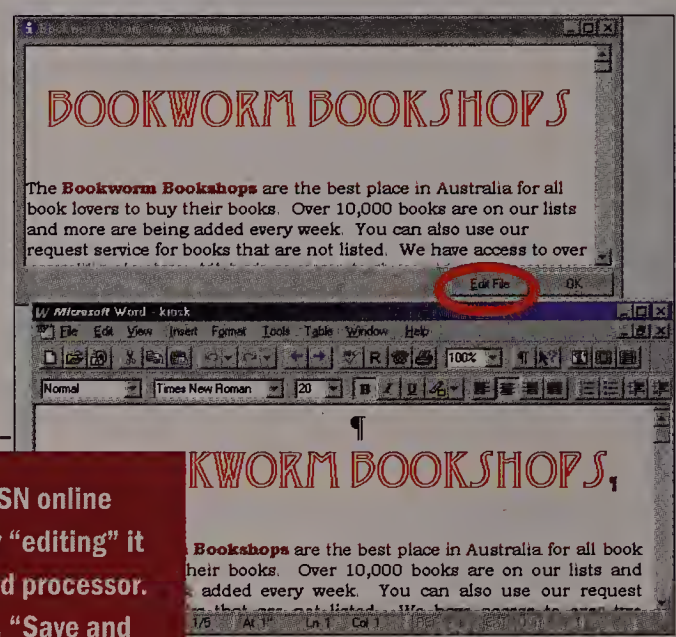
THE MICROSOFT NETWORK

35 Read and Write Mail Offline

You can cut down on online charges by logging on to MSN with Microsoft Exchange to automatically send and retrieve mail, then quickly logging off again. When you're offline, launch Exchange and write any outgoing mail. Then select *Tools•Deliver Now Using•The Microsoft Network* to upload and download mail.

36 Speed Your Way Around

While online, you can quickly write mail, go to your Favorite Places, or issue a go command. Simply right-click the tiny MSN logo on the right-hand side of Windows 95's Taskbar. A pop-up menu will appear with these choices.



Print an MSN online help file by "editing" it in your word processor. See tip 38, "Save and Print Text."

37 Read Many BBS Messages at Once

To display a group of BBS messages all at once so you can quickly read through them, select the messages you want in the BBS window, then press **<Enter>**.

38 Save and Print Text

Can't figure out how to save or print that MSN Information file because there's no drop-down menu that lets you do so? Click the *Edit File* button. The text will pop up in your word processor, and you can save or print it from there.

39 Get a List of MSN Go Words

You can get a list of all the places to go in MSN. Go to msndirect and click *Printable Lists*. Once the list is in a window, click *Edit File* to put it into your word processor, where you can search or print it.

PRODIGY

40 Read and Write Mail Offline

You can cut down on online charges by using a special Prodigy edition of ConnectSoft's E-mail Connection to log on to Prodigy at your command or at times you schedule. You can then retrieve your new mail, send any messages you've created, and log off automatically. To download the program, which is free as of July 7, jump to e-mail connection.

41 Stop Junk Mail

How many times have you seen the You've Got Mail icon and eagerly logged on to Prodigy Mail, only to find that your mailbox is filled with unsolicited advertisements? You can limit those annoying commercials by jumping to 'opt out' and clicking the *Take Me Off the List* button.

You'll still get occasional "news" from the Prodigy service, but no outright ads.

42 Free Speed-Up Macros

Prodigy for Windows features a simple built-in macro recorder. To record a macro, select *Goodies•Record Macro*, name the macro, click *OK*, and perform the actions you want to record. When you're done, select *Goodies•Stop Recording*. To play back a macro, select *Goodies•Play Macro*.

To find other members' macros, jump to file libraries, click the *file libraries* link, and select *Member Help (FREE)•Macros*.

Judy Heim is a contributing editor and Ann Kremers, Michael S. Lasky, and Lincoln Spector are senior associate editors for PC World. *Eric Isaacs, Yael Li-Ron, and Sally Neuman contributed tips used in this article.*

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We collected even more tips on using online services, and we've made them available on PC World Online. Check out http://www.pcworld.com/aug96/tips.html for a special, extended version of this article.

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Source: *PC World* Reliability & Service Monitor, May 20 - November 20, 1995

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- Prodigy, America Online & CompuServe trial memberships
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- Microsoft Windows 95 & MS Plus! CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- Quicken Financial Pak includes: Quicken Deluxe 5.0; Quicken Financial Planner; Quicken Parents' Guide to Money; Quicken Family Lawyer
- Microsoft Home Pak includes: Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encarta 96; Encarta 96 World Atlas; Music Central 96; Wine Guide; Arcade 1.0; Scenes—Sports Extremes Collection; Cinemania 96; Julia Child Home Cooking; Best of Windows Entertainment Pack; CD Sampler (including Fury3 game demo)
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- Microsoft Mouse, 104-key keyboard
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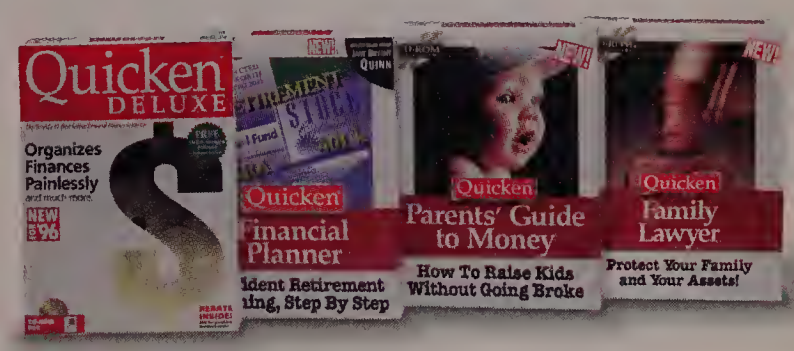

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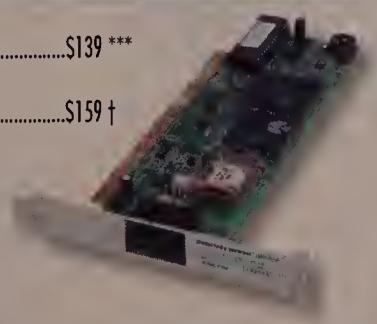

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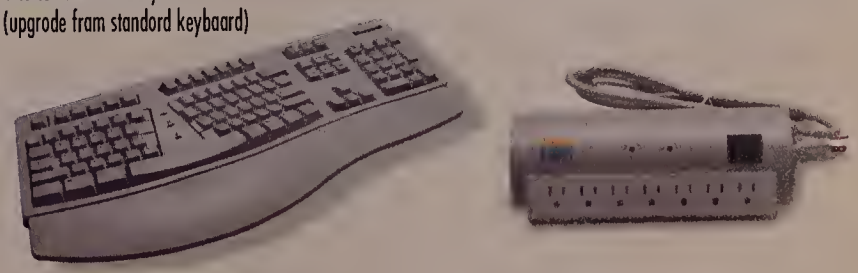

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BEST WEB BROWSER

A browser is your passport to sites and sounds on the Web. Is it time to trade in Netscape's Navigator for Microsoft's Internet Explorer?

BY PC WORLD STAFF

Hitting a new Web site these days can be an interactive adventure. Will an animated logo or the thump of jungle drums greet you? Will you be able to stroll through a trade show held in a virtual building, or see content tailored just for you? You can enjoy all the World Wide Web's latest bells and whistles if you have the right browser—one that can take advantage of whatever a site has to offer.

Not long ago, almost a dozen browsers vied for the chance to take you to the hundreds of thousands of sites that make up the Web. But after a year of product shake-outs and some fast moves on Microsoft's part, Netscape's Navigator and Microsoft's Internet Explorer have emerged on top. Why? Both companies have blazed new trails in developing and supporting extensions to HyperText Markup Language, the programming language used to create Web pages. As a result, Navigator and Internet Explorer are the best browsers around for seeing and interacting with all the hottest Web content—from a silly slide show of Hillary Clinton's mutating hair to applications that calculate a mortgage payment. Other browsers just can't keep up. They don't support the latest HTML extensions, they're slower at downloading, or they lack features in some other crucial area. (For an update on these browsers, including NCSA Mosaic, the one that started it all, see "Where Have All the Browsers Gone?")

In this head-to-head review of Navigator and Internet Explorer, we compare ease of use, performance, Web savvy, security features, and workgroup and Internet tools. (Note: International Data Group, *PC World*'s parent company, is a minority shareholder in Netscape Communications.) Ordinarily, we review only shipping versions of products. But Web browsers are moving targets: If you don't mind the rough edges, you can begin using beta and even alpha versions of browsers by downloading them. So for this article, we bent our rules a little and looked at the betas of Navigator 3.0 and Internet Explorer 3.0, which we pulled off the two companies' Web sites. At press time, neither beta had everything the companies had promised. So we have to reserve judgment on some features, such as Internet Explorer's support for Java. But by the time you read this, both Navigator 3.0 and Internet Explorer 3.0 should be available in final form.

Navigator and Internet Explorer are alike in many ways. Both offer a core set of features that conform to the HTML 3.0 standard, so you can use either product to see basic Web text, headlines, images, lists, tables, and hot links. To handle the wide variety of file types that many sites now incorporate, both browsers use helper

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applications to display or play back data. Both have attractive, easy-to-use interfaces for easy return to favorite Web sites. Both are simple to install and a snap to acquire. Internet Explorer is free and comes with Windows 95; Navigator costs only $49.

But beyond these shared characteristics, the two browsers are waging a war of enhancements, proprietary extensions, and me-too compatibility not likely to end soon. Navigator 2.0 fired the first salvo when it added support for three important Web tools: frames, plug-ins, and the Java programming language. Frames make Web sites easier to navigate by dividing them into multiple, independently scrollable panes. Plug-ins, third-party program modules that extend a browser's capabilities, and Java, which is used to create embedded Web apps, both make sites more interactive. Thanks to these extras, Navigator has grabbed an extraordinary 75 percent of the browser market, compared to about 10 percent for Internet Explorer.

But now it looks as if it's Netscape's turn to play catch-up. Not only can Microsoft's Internet Explorer 3.0 view frames, but the company has also developed ways to improve that technology. The beta we saw didn't have Java or plug-in support, but we expect the final version of Internet Explorer 3.0 to have those features, too. The surprise is that Internet Explorer has become the better choice for workgroups. We tried the whiteboard, chat, and Internet phone tools that both products have added, and Internet Explorer really wowed us. Neither browser allowed more than two people to simultaneously use the phone, but Internet Explorer easily beat Navigator's one-to-one chat and whiteboard utilities by letting several people participate at once. The real tie-breaker is Internet Explorer's new application sharing capability. Using NetMeeting, you can give others control over an application or folder on your local hard drive. This feature alone could make Internet Explorer a popular way of providing technical support over an intranet, for example.

So which browser is better? It's a tough call. For Web surfing, either is fine. But if the idea of using a browser to work with other people appeals to you, Internet Explorer's NetMeeting is a killer set of apps.

Which browser will win in the long run? That's even harder to predict. Navigator has the popular vote, and it still does some things better than Internet Explorer, such as the way it handles bookmarks. But Internet Explorer clearly poses a serious challenge. Microsoft is giving it away—using Netscape's old tactic for accelerating acceptance. And Internet Explorer 3.0 will be able to use Navigator bookmarks, a nice bit of compatibility that Netscape hasn't bothered to provide yet. However, the biggest blow most certainly would be Microsoft's plan to make Internet Explorer the hub interface for Windows, an add-on option rumored to be available in a few months.

For a blow-by-blow comparison of Navigator 3.0 and Internet Explorer 3.0, read on. May the best browser win.

Bryan Hastings, Amy Heleu Johnsou, Yael Li-Ron, Richard Scoville, aud Carla Thornton contributed to this story. Amy Johnson is a freelauce writer specializiug iu Internet technology. Richard Scoville is a contributing editor, Bryan Hastings aud Yael Li-Ron senior associate editors, and Carla Thornton senior reviews editor for PC World.

FEATURES COMPARISON Explorer Challenges Navigator

For reading Web pages, it's a toss-up between Navigator 3.0 and Internet Explorer 3.0. For workgroups, Internet Explorer is the better browser.

● = Yes ○ = No

Standard features	Internet Explorer 3.0 [1]	Navigator 3.0
Price	free	$49
Windows 95 support	●	●
Windows 3.1 support	●	●
Other platforms	Mac, NT	Mac, NT, UNIX
Ease of use	very good	very good
History	very good	fair
Windows 95 Shortcuts to Web sites	●	●
Page markers	good	excellent
Navigation	very good	excellent
Help system	very good	good
Performance	excellent	excellent
Rendering speed	excellent	excellent
Simultaneous tasks	●	●
Option to load text before graphics	●	●
Text-only mode	●	●
Reading Web pages	good	very good
HTML tables	●	●
Frames	●	●
Animated GIF files	●	●
ActiveX	●	● [2]
Interprets Java, JavaScript programs	○	●
Accepts plug-ins	○	●
Workgroup tools	very good	good
Whiteboard	excellent	very good
Internet phone	good	good
Application sharing	●	○
Security	very good	excellent
Supports Secure Sockets Layer 3.0	●	●
Supports RSA 128-bit encryption	●	●
Tools for other Internet services	very good	very good
E-mail client	very good	very good
Newsgroup reader	very good	very good
FTP capabilities	fair	fair

[1] Based on features implemented at press time.

[2] Through Ncompass ActiveX plug-in.

Ease of Use

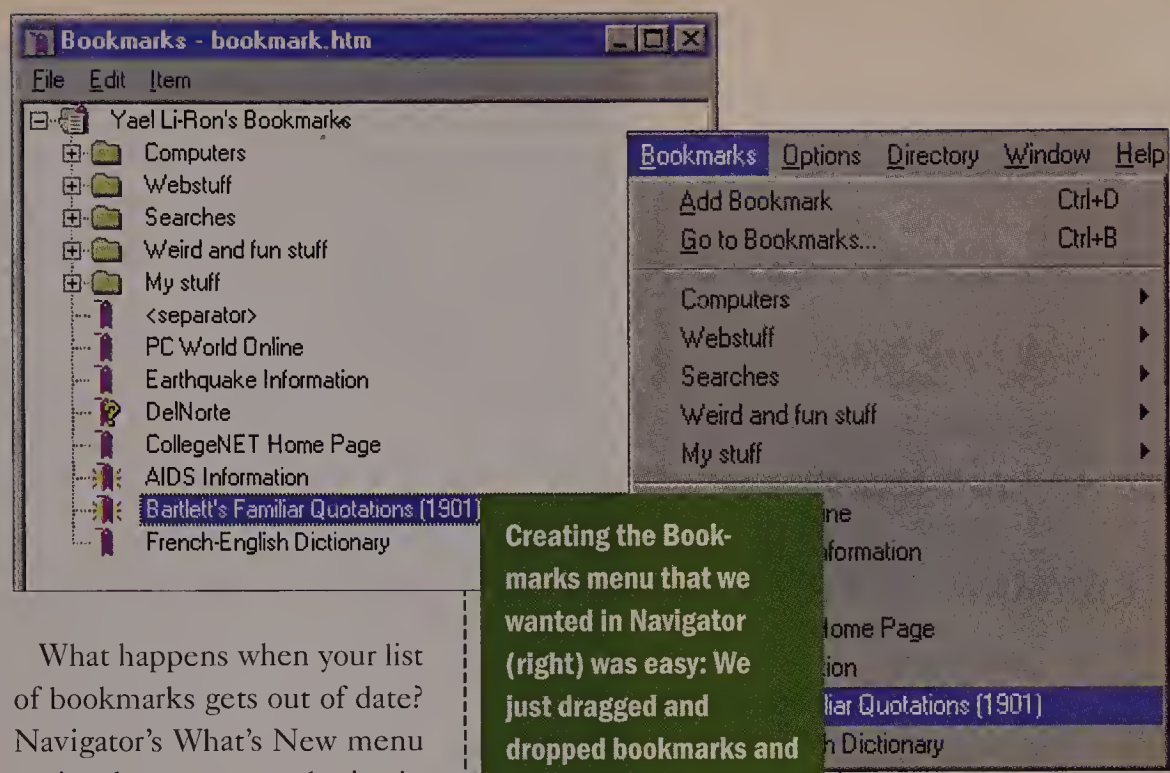
INTERNET EXPLORER: Very good
NAVIGATOR: Very good

With the existence of over 7 million Web sites, you can easily drown in the Internet. Navigation shortcuts and bookmarks help you swim safely through that flood of information. Internet Explorer and Navigator both provide bookmarks (which Explorer calls Favorites) and lots of other ways to get to sites quickly.

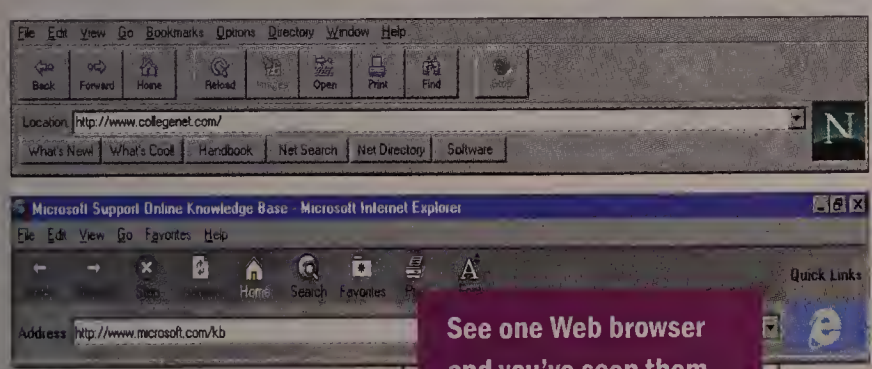
Both browsers cache pages you've visited so that the sites reappear quickly the next time you return to them. Both also keep a separate history of where you've been on the Web. But Internet Explorer's implementation is better. Unlike Navigator, which deletes its list of sites every time you exit, Internet Explorer maintains a history from session to session if you like, saving the URLs as Windows 95 Shortcuts.

When you find a site you want to revisit, both browsers let you mark its page and easily return to it by selecting from a drop-down list on the toolbar. But Navigator stores them in a regular HTML file, making it possible to incorporate them as hot links into your own Web pages, for example. You can easily reorder the bookmarks by dragging and dropping, and use menu options to create cascading folders. You can even create aliases for URLs, so you can insert the same bookmark into more than one folder.

Internet Explorer turns to Win 95's Shortcuts to store Favorites. You can organize your Favorites easily into hierarchical folders, just as you would any other files on your hard disk. But Internet Explorer lacks Navigator's elegant touches, like the ability to group related sites in the Bookmarks menu by drawing separator lines between entries.



Creating the Bookmarks menu that we wanted in Navigator (right) was easy: We just dragged and dropped bookmarks and inserted a separator to create subgroups (left).



See one Web browser and you've seen them all. It's easy to switch between Navigator (top) and Internet Explorer (bottom): Their interfaces are similar and easy to learn.

What happens when your list of bookmarks gets out of date? Navigator's What's New menu option logs on to each site in your bookmark list to check whether the site content has changed. For instance, if you wanted to know every time PC World Online posted a new issue, you could check your list in Navigator instead of repeatedly accessing the site. Internet Explorer 3.0 has a similar feature in the works, but it wasn't available for testing by our deadline.

What if you head for a new site? Navigator 3.0 has the edge: It accepts abbreviated Net addresses, without the http://www. prefix and .com suffix. Internet Explorer assumes only the http:// prefix.

If Microsoft consistently does one thing right, it's help systems. Internet Explorer's help, a nice utility with an extensive index and clear tutorials, is built into the browser. Navigator, by contrast, sends you to Netscape's Web site for help. We much prefer help files on our hard disk; after all, what use is help on a Web site if you need assistance getting connected in the first place?

Performance

INTERNET EXPLORER: Excellent
NAVIGATOR: Excellent

What's the most frequent complaint about Internet surfing? It's s-l-o-w. Your Web browser should speed things up. When it comes to bringing up sites quickly, Navigator and Internet Explorer run neck and neck.

To compare pure display speeds, the PC World Test Center measured the time that each browser needed to load several Web pages laced with performance-dragging multimedia elements. We used a closed two-PC network to eliminate any delays due to network traffic. We tested only the 2.0 versions of the browsers to avoid punishing unstable prerelease products. Navigator 2.0 and Internet Explorer 2.0 finished the renderings in a dead heat, with Internet Explorer just slightly faster.

In addition to their raw performance, both Internet Explorer and Navigator are chockfull of tricks that make your surfing speedier. Both browsers allow you to do multiple tasks at a time, such as browsing one Web page while downloading a file from another, or simultaneously viewing two sites in different windows.

In addition, these browsers circumvent the most common downloading bottleneck—graphics—by giving you the choice to view only the text of a Web page, or to load text before graphics. In the latter case, you can often drill down into a Web site by clicking on hot-linked text, without having to wait for the graphic to appear. If you do want to see graphics, both browsers support progressive rendering, a method of speeding up a download by displaying interlaced images in several passes with increasing resolution. Progressive rendering often lets you recognize an image before it's fully drawn, so you can decide whether to stay on that page or continue on your way.

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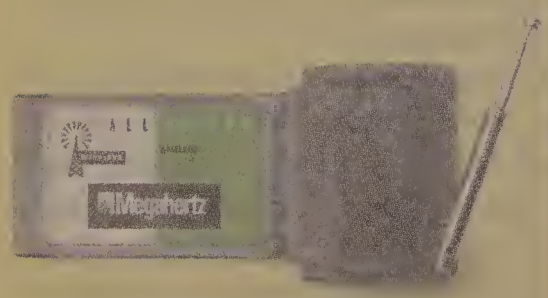

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Reading Web Pages

INTERNET EXPLORER: Good
NAVIGATOR: Very good

Can Internet Explorer 3.0 and Navigator 3.0 see everything on the Web? The answer is a qualified yes. Each company pushes its own HTML extensions; sometimes one browser ignores its rival's proprietary extensions or implements them differently.

For example, Navigator 3.0 supports Microsoft's Web page tags for background music and background colors for individual table cells. But it still can't display Microsoft's marquee tags. This means that if you use Navigator to view Microsoft's Web site (http://www.microsoft.com), you won't see the scrolling text that displays in Internet Explorer.

For the majority of sites, however, you won't notice any differences between the two browsers' display capabilities. Internet Explorer 3.0 can see frames and adds a couple of enhancements: New Microsoft HTML extensions will let Web sites display frames without borders, giving the page a less cluttered look. And authors of Web sites will also be able to give viewers the option of moving frames around and even minimizing some frames for convenience. Navigator, which introduced frames, corrects a sore point of its own in version 3.0. Previously, pressing the Back button took users to a previous site, not the previous frame. That snag has been fixed.

Both browsers can display almost any Web content.

At press time we had not yet seen Internet Explorer 3.0's much-anticipated support for Java applications or Navigator plug-ins. But Microsoft promises that version 3.0 will work with both by the time it comes out in its final form, using the company's new ActiveX technology. Navigator 3.0, in turn, will use an Ncompass add-on (also called ActiveX) to read plug-ins and applications

Where Have All the Browsers Gone?

At one time, Netscape's Navigator was just another Web browser, with plenty of competition from products developed by organizations ranging from online services to universities. Then Microsoft rushed its Internet Explorer into the fray, and the two browsers promptly squeezed out the little guys.

We reviewed nine Web browsers besides Navigator in our June 1995 issue; here's what's happening with them today.

Cello 1.01a There's no sign of the promised 2.0 upgrade, but the Legal Information Institute at Cornell University Law School still offers version 1.01a free from its Internet site. This browser was looking old when we reviewed it last year; by now it's positively ancient, with no support for frames or Java applets. http://www.law.cornell.edu/cello/cellotop.html

Spyglass Mosaic 2.11 Formerly Enhanced Mosaic 2.0, this browser is highly competitive with the Netscape and Microsoft offerings. You can't buy it directly, however; Spyglass sells it only to other companies for use in their Internet products. http://www.spyglass.com/products/mosaic_download.html

Internet Chameleon 4.5 for Windows 95 and Windows 3.1 Access to Web sites is only a small part of NetManage's Internet Chameleon 4.5. This package's selling points are its dial-up ability and integration among 18 different Internet utilities. Its Web browser, on the other hand, is relatively weak. http://www.netmanage.com/netmanage/products/intcham.index.html

InternetWorks 1.0 InternetWorks is now bundled with America Online's Global Network Navigator service and isn't sold commercially. http://gnn-e2a.gnn.com/gnn/join/joingnn/member.html

Mosaic in a Box for Windows 95 CompuServe Internet Division (formerly known as Spry) released Mosaic in a Box for Windows 95 last August. The browser hasn't kept up with the times, however. It lacks support for leading-edge elements like frames and HTML tables. http://support.spry.com/public/mbox/

NCSA Mosaic 2.1.1 The National Center for Supercomputing Applications deliberately waits until new features are widely accepted standards before integrating them into NCSA Mosaic, now at version 2.1.1. NCSA Mosaic handles the majority of Web sites without a problem, but look to Navigator or Internet Explorer for viewing the spots that use the hottest design techniques. http://www.ncsa.uiuc.edu/SDG/Software/WinMosaic/

NetCruiser 2.1 Netcom's NetCruiser 2.1 is available only with a Netcom account. http://www.netcom.com/netcom/netcrz.html

SuperHighway Access 2 SuperHighway Access 2 packs nearly as many features as Internet Explorer or Navigator. But some of the problems we complained about back in our June 1995 review are still around. (For example, you still can't cache documents from previous sessions.) http://www.frontiertech.com/products/sha2.htm

winWeb 1.0 A2.3 winWeb no longer exists as a stand-alone product. EINet, now TradeWave, incorporated the browser into Virtual Private Internet 2.0, a tool kit to build secure corporate intranets. http://galaxy.tradewave.com/tradewave/products/tradevpi.html

—Amy Helen Johnson

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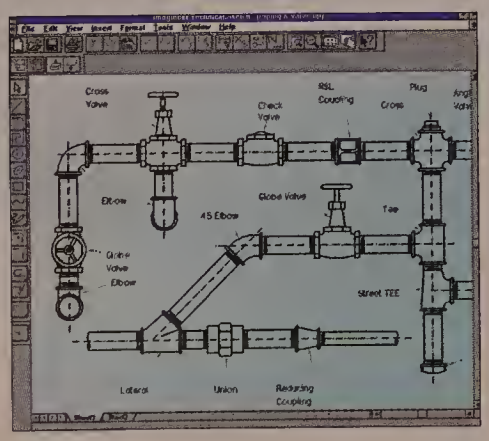

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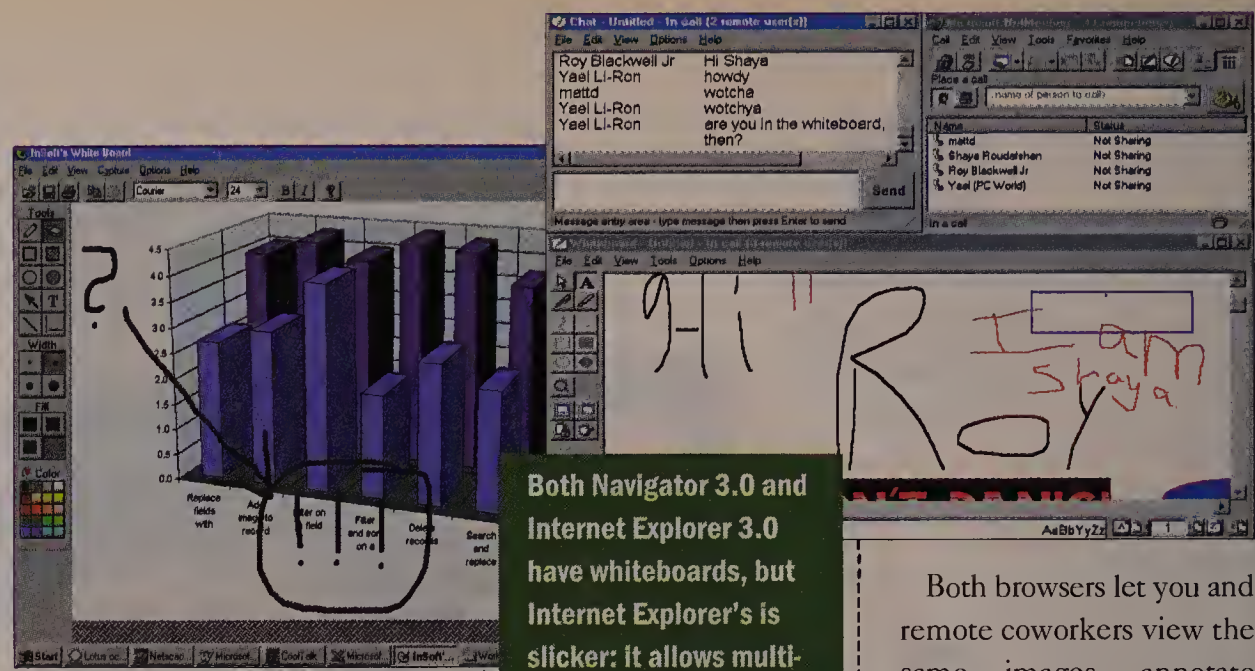
that were created with Microsoft's ActiveX.

Internet Explorer 3.0 and Navigator 3.0 will both be capable of playing video and sound files embedded in a Web page, without needing helper applications: You'll be able to hear and see what a site has to offer without having to first load an extra program. And both browsers will let you view 3-D Web sites created with the Virtual Reality Markup Language.

Have you ever linked to a foreign-language site, only to see gibberish? Both Internet Explorer 3.0 and Navigator 3.0 will provide foreign character sets so you can see these sites in their native languages. The character sets will be built in to Internet Explorer, and Navigator will use the Internet with an Accent add-on.



Both Navigator 3.0 and Internet Explorer 3.0 have whiteboards, but Internet Explorer's is slicker: It allows multiple users to view and annotate the same document simultaneously.

Workgroup Tools

INTERNET EXPLORER: Very good
NAVIGATOR: Good

Have you ever thought of a browser as a workgroup application? That's what the 3.0 versions of Internet Explorer and Navigator have become by adding whiteboards and Internet phones.

Both browsers let you and remote coworkers view the same images, annotate them, and save them to local hard drives while discussing them—all over the Internet. But Microsoft's new NetMeeting technology is more sophisticated than CoolTalk, the whiteboard and telephony bundle that Netscape acquired when it bought InSoft Inc. For one thing, NetMeeting's whiteboard and chat utilities support multiple simultaneous users, unlike CoolTalk, which allows only two people to connect at the same time.

What's more, NetMeeting lets you share your applications with other people over the Internet. We tested this feature by letting a long-distance colleague take control of a Word 7 for Windows 95 document on our local hard drive. It was slow, even with only two people connected, but it worked fine. No doubt about it: This could be the application that gives Internet Explorer the clout it needs to overtake Navigator.

Security

INTERNET EXPLORER: Very good
NAVIGATOR: Excellent

What if you sent your credit card number over the Internet and found out during the next billing cycle that somebody had siphoned off the data and used it to buy a plane ticket to Tahiti? If you're unlucky enough to fall prey to a really determined hacker, it's possible—but unlikely with either browser. Both Navigator and Internet Explorer have extensive security mechanisms built in, based on Secure Sockets Layer 3.0 and the RSA public-key encryption system. These two standards scramble the data you transmit over the Internet, preventing anyone who might be eavesdropping from understanding what you're transmitting.

Where to Get Them

How can you get a copy of Navigator or Internet Explorer? Let us count the ways. Like a couple of politicians in an election year, Netscape and Microsoft are campaigning hard to win you over to their camp. Following is a quick guide to picking up one (or both) of the most popular Web browsers.

Web sites **Nothing beats free, which is what Internet Explorer is—at least for now. Not only does it come with the Windows 95 operating system, but you can also download it at no cost from Microsoft's Web site (http://www.microsoft.com). You can download a copy of Navigator from Netscape's site (http://home.netscape.com), but it's no longer free. By the end of the 90-day evaluation period, you'll need to ante up $49.**

Online services **Thinking of subscribing to an online service? CompuServe and America Online will soon make Internet Explorer their default browser, with Navigator as an option. Prodigy will offer Navigator, but not Internet Explorer.**

ISPs **If you decide to access the Internet through an Internet service provider, you're likely to wind up using either Navigator or Internet Explorer as your Net interface. Literally hundreds of service providers, ranging from AT&T to small start-ups such as Earthlink, bundle or recommend one browser or the other. Microsoft holds the edge in sheer number of deals struck, probably because it provides Internet Explorer to service providers at no cost.**

Off the shelf **Both browsers are available retail or from the vendors in special packages. Navigator Personal Edition (which also sells for $49) adds a dial-up kit. (You can use Microsoft's dialer with Internet Explorer if you have Windows 95.)**

Microsoft's $10 Internet Starter Kit bundles Internet Explorer with step-by-step instructions for beginners and 30 free hours on the Internet via The Microsoft Network.

—Carla Thornton

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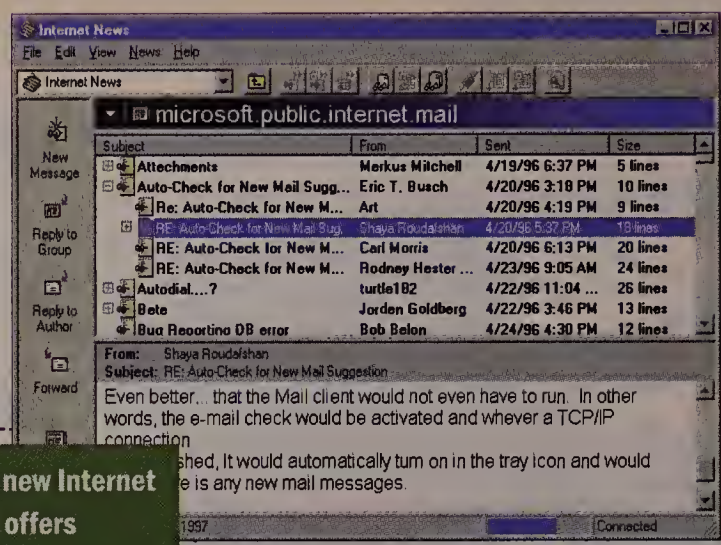
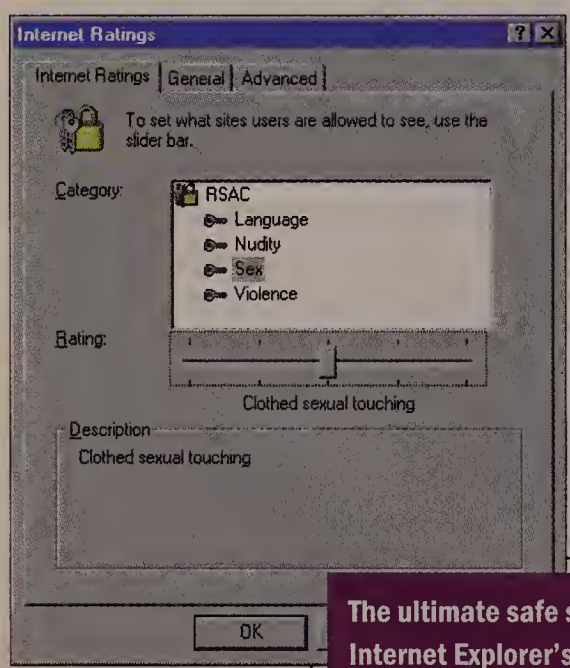
Commercial Web sites that allow credit card purchases, or conduct business that involves other types of sensitive information, can take advantage of SSL 3.0 or RSA public-key encryption by applying for a certificate of authentication from an independent organization. One such organization is VeriSign (http:/www.verisign.com), a public certificate authority that provides digital authentication services and products for electronic commerce and other forms of private computer communications.

When you place an order with a certified site, its server tells your browser that the organization is legitimate. SSL 3.0 now provides personal certificates, the flip side of site certificates. A personal certificate proves that you are who you say you are (think of the certificate as a picture ID for the Internet) and prevents anyone from masquerading as you.



Microsoft's new Internet newsreader offers threaded discussions and an easy-to-use interface. It can be used as a stand-alone program (shown here) or inside Windows 95 Explorer.

Downloaded Java applications can also pose security risks, according to Princeton University researchers (see *Bug Watch*, June). Security holes in Java and JavaScript, languages developed jointly by Netscape and Sun Microsystems, could allow programmers with malicious intent to build Java applications that tamper with your PC, say the researchers. But Netscape claims that the holes are so difficult to find that it's unlikely anyone would bother to ferret them out and use them. All the holes that the Princeton researchers identified in the programming languages have now been fixed, and Netscape will continue to patch any as they're found, said a Netscape representative. No Navigator customers have reported any problems with Java applications, he noted. According to Microsoft, Internet Explorer will help protect users from rogue applications by identifying their source and whether they've been modified since being posted.



The ultimate safe sex: Internet Explorer's new rating tool lets you protect your child (or yourself) from any level of offensive language or imagery on the Net.

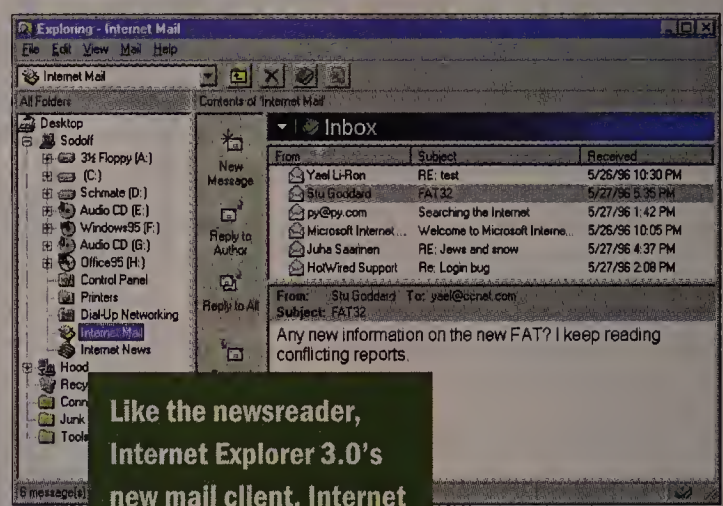
Parental control over Web content is a growing issue. If you're concerned about your kids surfing the seamier shoals of the Web, you'll like Internet Explorer 3.0's parental control tool, which lets you determine the levels of obscenity and violence you'll accept at Web sites. Those sites that adhere to the Recreational Software Advisory Council's rating system will be identified with a special tag, and anyone visiting an unrated or adult-oriented site will be prompted to enter a password.

Tools for Other Internet Services

INTERNET EXPLORER: Very good
NAVIGATOR: Very good

What's the Internet without interaction with others? E-mail and newsgroups are major attractions on the Net, but you wouldn't know it by looking at the anemic utilities available in Internet Explorer 2.0. But all that's changed in version 3.0: Its newsreader and e-mail clients not only now stand toe-to-toe with Navigator's, they can also be used as stand-alone products or integrated into the Windows 95 Explorer—a nice touch. Both Internet Explorer's and Navigator's e-mail utilities include address books and support for MIME, the common way to transmit binary files such as images and executable programs. The only features Navigator has that Internet Explorer lacks are address grouping and scheduled mail retrievals.

Newsgroups are another popular Internet service. Navigator's well-organized, multipaned newsreader lets you quickly zero in on new messages. Internet Explorer 2.0 was afflicted with a dismal single-frame newsreader, but version 3.0 offers a newsreader that's very similar to Navigator's. Our beta of Internet News did not include offline reading, but Microsoft promised that the final version would.



Like the newsreader, Internet Explorer 3.0's new mail client, Internet Mail, integrates nicely into Windows 95 Explorer (shown here) or works as a stand-alone utility.

File Transfer Protocol support? Forget it. Both browsers let you download files from the Web address line, but for uploading you should rely on a third-party FTP client such as WS-FTP32.

So which Web browser will you be having today? Netscape's Navigator 3.0, Microsoft's Internet Explorer 3.0, or both? You can't go wrong with either of these browsers. And if you really need a workgroup intranet tool that integrates with Windows 95, then look no further: For now, the winner is Internet Explorer 3.0.

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PC MAGAZINE EDITORS' CHOICE™
February 20, 1996
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- PCI Matrox Millenium graphics card with 3D acceleration and 2MB WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT 3.51 or IBM OS/2® Warp
- Free three-year limited warranty for parts and labor[1]

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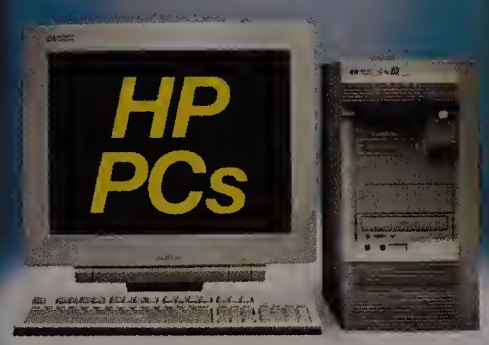

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BEST ONLINE SERVICES

With all that's free on the Internet, do you really need an online service? We rate America Online, CompuServe, and Prodigy to see if they're worth the price.

The Internet may be a jungle, but commercial online services like America Online and CompuServe are safaris. You get access to the World Wide Web, newsgroups, and an e-mail gateway, all with fewer inconveniences—and at a higher cost.

If all you want is unlimited Net access, an Internet service provider with a flat rate is probably the best, most economical way to travel (see "The No-Nonsense Guide to Internet Access," July.) But if you're looking for the easiest route through the Net, an online service can be an excellent guide.

Online services offer rich, original content that's well organized and easy to find—unlike the wild and often chaotic Web. You get top-notch reference resources, technical support for a wide range of products, and virtual communities that are better moderated than most on the Internet. Broad networks of local access numbers let you connect to online services from anywhere in the United States and often beyond. Best of all, you don't have to teach your computer to speak TCP/IP or outfit your e-mail in-box. Just log on to a service and begin your expedition.

BY DYLAN TWENEY

Assuming you're willing to shell out for added content, community, and easy Net access, which online service should you join? These days, you have essentially three choices: America Online, CompuServe, and Prodigy. At press time, The Microsoft Network was in the process of converting from a traditional online service to a Web-based content provider—a route that the big three also plan to pursue. (See "The Future of Online Services.") But the new MSN lacks a proprietary interface and e-mail services—key aspects of a commercial online service.

We've scrutinized the three major online services, rating each one's e-mail, chat, forums, Internet access, and more. Our conclusions? AOL is the easiest service to use and the best place to meet people who share your interests. CompuServe is the best resource for in-depth business and computing information, but the surcharges can add up fast. Prodigy is a reasonable choice if you want to share your account with several family members.

Just remember, the meter's running whenever you're online. If you log on for 10 hours or less each month, all three services cost about the same. If you rack up between 10 and 40 hours a month, Prodigy's 30/30 Plan gives you the best deal. And if you are online more than 45 hours a month, CompuServe is tops—provided you don't spend too much time in its premium areas.

Dylan Tweney is the author of The Traveler's Guide to the Information Highway *(ZD Press, 1994, 800/716-0044). Yael Li-Ron is a senior associate editor and Daniel Tynan an executive editor for* PC World.

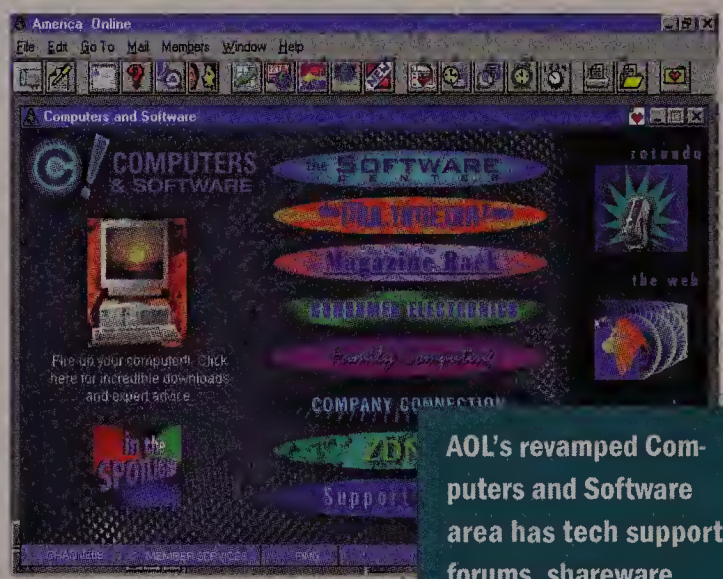
For more information about all products in this article, circle reader service no. 911.

AMERICA ONLINE

Desktop Jumanji

Wilder and more unpredictable than the other two online services, America Online is like the board game in *Jumanji:* Strange creatures can pop up at any time, especially if you venture into its chat rooms.

With some 6 million subscribers, America Online is the largest commercial service, and it's likely to get a lot bigger. At press time, AOL announced that its software will be integrated into Windows 95. (CompuServe software will also come as part of Win 95.)



AOL's revamped Computers and Software area has tech support forums, shareware libraries, and buying advice but is still no match for CompuServe's services.

With that many users, it's no wonder that AOL boasts the largest and liveliest online communities of any service. From teens to amateur investors to fans of Oprah Winfrey, almost everyone can find at least one place here to call home.

In the past, the sheer number of people who dial up AOL each day has led to problems maintaining reliable dial-up access. (AOL says it has greatly expanded its local access network over the past year to improve reliability.) And the quantity of participants in bulletin board discussions, online events, and chats can be overwhelming. How can you get a word in edgewise in an auditorium filled with 3000 fast typists?

Idle Chatter

America Online's strongest suit is People Connection, its collection of chat rooms. Frequent auditorium events feature lectures and interviews by celebrities who field real-time questions from the audience. And AOL's Instant Message feature lets you send a quick note to any other member, initiating an impromptu private chat.

Many AOL chat rooms are dens of cybersex. You will be amazed at the number of rooms devoted to flirting, romance, and less subtle interactions. AOL makes it easy to create public rooms for group discussions, and private rooms for conversations that are best done tête-à-tête (à-tête-à-tête-à-tête...). Parents will rest easier knowing that AOL lets them restrict access to these areas.

AOL's message boards are another story. It's harder to post messages on AOL than it is on CompuServe. Messages are often buried several folders deep and can be hard to find; and they aren't threaded, which means you can't easily follow complex discussions. There's also no easy way to search for messages from a particular person or containing a specific word, and no way to see quickly whether anyone's responded to something you posted. Finally, you can't create messages offline, though you can create a log of messages you've selected and read it later.

On the other hand, AOL's e-mail operation is quite serviceable. You can compose e-mail messages offline, then transmit them in batches, which helps to keep costs down. And it's the best at handling Internet e-mail. But you'll have to enter each address manually in the address book. And when you save e-mail, AOL's cumbersome Personal Filing Cabinet feature lumps downloaded files, your Favorite Places folder, newsgroup messages, and the e-mail all together, cluttering your screen.

ONLINE SERVICES REPORT CARD

Overall, CompuServe just barely aces out America Online, thanks to greater depth of content.

Service	E-mail	Chat	Forums	Content	Internet access	Ease of use	Speed	Overall
America Online	A–	A+	C	B+	B+	A	B	B+
CompuServe	A–	B–	A	A+	B	B	A	A–
Prodigy	C	B	B	B	C+	A–	B–	B–

AOL HOT SPOTS

CENTER STAGE • Get up close and virtual with celebs like William Shatner and Mike Wallace. Keyword live

THE HUB • Weird and amusing tidbits for the goatee and double-espresso crowd. Keyword hub

LOST IN AMERICA • Join five intrepid travelers as they roam the back roads of these United States. Keyword lost

THE MOTLEY FOOL • Sage, often tongue-in-cheek advice on matters financial. Keyword motley

OPRAH • Inside news, polls, forums, live events, and more with the doyenne of daytime TV. You'll laugh, you'll cry, you'll reach into the freezer and break out the butter brickle. Keyword oprah

If you're looking for serious reference information or customizable views of current events, AOL is probably not for you. While the service has several encyclopedias and robust investment information, it lacks CompuServe's industrial-strength resources for technical, business, and market research. It also lacks a one-stop center for customizable news, stock quotations, and company information. Nor can AOL's computing information and technical support touch CompuServe's for quality or depth.

Easy Internet

America Online's Internet tools are probably the best of the big three. By the time you read this, AOL's default browser will be Microsoft's Internet Explorer, although you will also be able to use Netscape Navigator. You can configure America Online to work with other 16-bit Internet utilities, but doing that can be tricky.

AOL's newsgroup reader is the easiest to use, but there's no search tool to zero in on the topics you want. AOL's e-mail gateway is also tops: It automatically decodes messages containing encoded binary files. The other two services support only text messages to and from the Internet. Another nice touch: America Online automatically moves those long Internet mail headers to the *bottom* of your message.

Finally, wary parents will appreciate AOL's extensive parental controls, which let them block access to any newsgroups, chat rooms, or download areas that are too "mature" for young audiences. CompuServe and Prodigy also provide some parental control over content.

Looks Count

AOL's consistent interface makes it the easiest service to use. Sure, some sections have snazzy introductory menus, but scratch the surface and you'll find AOL's familiar windows and list boxes all the way down. Unlike with CompuServe, no alternate interfaces are available. However, you can use shareware add-ons such as BPS Software's PowerMail, which replaces AOL's e-mail front end ($35; 703/716-9137), or Prism Elite's Way To Go, which offers offline readers for e-mail, newsgroups, and message boards, as well as other time-saving tools ($25). You can find copies of these programs on PC World Online.

You can also keep many windows open at once, and AOL multitasks several online activities smoothly. For example, you can scan a bulletin board and send an instant message to your business partner, all the while downloading a file and puzzling over the latest news. However, you can only participate in one chat conversation or download one file at a time.

An America Online account can include up to five different screen names, each with a separate password, mailbox, and set of access privileges (the latter determined by the main account holder). Use this feature to put your whole family online, or to separate

The Future of Online Services

Not long ago, the differences between online services and the World Wide Web were obvious. A commercial service gave you well-organized content and tightly knit user communities, but you had to use the service's interface and pay hourly fees. The Web was far less organized, but the information was free to anyone with a Web browser and the urge to surf.

Now the distinctions are blurring, thanks in part to The Microsoft Network. Any Internet user can access MSN by dialing up its Web site (www.msn.com). But while MSN's daily news service is free, you'll have to hand over your credit card number to access the site's online encyclopedias, user chat, and other content. Prices range from a flat $6.95 per month to $49.95 per year (Microsoft, 206/882-8080).

Microsoft is also spreading the Web gospel via a new suite of tools for developing Web-based online services, code-named Normandy. Its first customer? CompuServe. The world's oldest commercial service plans to move most of its content to the Web by year-end.

They're not alone. For the past year, Prodigy has been moving content to its Web site (www.prodigy.com). This fall it will emerge as a Web-based online service, mixing free pages with subscription-based offerings (pricing was not available at press time). Prodigy's new interface will be a version of the Netscape Navigator Web browser; current Prodigy users will still be able to access the service using the old software.

Meanwhile, the lone holdout, America Online, won't confirm any plans to convert to Web-based content. Instead, the company says it's helping to create chat rooms, instant messages, live events, and other AOL-style features for a variety of Web sites. Later this year, the AOL faithful should be able to chat directly with non-AOL members surfing these sites.

"For the most part, the days of hoarding all users inside one proprietary online environment are dead," says Rick Spence, an analyst with Dataquest in San Jose, California. Although the services will continue to support users of their existing interfaces, Spence says, "the new world will be a nonproprietary one." —Daniel Tynan

GEOFF SPEAR

online business and pleasure. However, unlike with Prodigy, only one screen name per account can be logged on at any given time.

Art of Darkness

You'll get very familiar with the 'Please wait while we add new art to AOL' message that appears whenever you visit a new area. Fortunately, this art is cached to your hard disk, so the same areas will appear more quickly when you return to them. Version 3.0 of the America Online software, due late this summer, will display the text first, so you can at least read something while the art is being filled in.

If you're lucky enough to have Internet access via high-speed ISDN or T1 lines, you can connect to AOL using TCP/IP, the Internet's communications protocol. When you do, AOL's screens will pop up at light speed. If you're like most people, however, you'll connect to AOL through a modem. AOL's wide network of dial-up access points supports connection speeds up to 28.8 kbps. Unfortunately, AOL is not always available around the clock: The service reserves the right to be offline for maintenance between 4 a.m. and 7 a.m. EST.

AOL will seem much snappier if you're the type who sticks to the beaten path, frequenting a few favorite places and rarely striking out into new territories. If you're an explorer, you'd better be patient. *America Online, 800/827-6364*

Reader service no. 800

COMPUSERVE

Upriver Expedition

For years, CompuServe was the Amazon rain forest of online services—vaster, denser, and more interesting than anything else you could access via a modem. Though it's been surpassed of late by the friendlier AOL and the wilder Web, the upcoming move to the Net may help revitalize the service.

CompuServe organizes its vast array of content into 12 broad categories, some of which contain hundreds of resources.

CompuServe's strength is its databases, some of which cost hundreds of dollars an hour in surcharges. It's really for serious business users who need access to e-mail, information, or support forums.

Content Is King

If you need top-flight information and are prepared to shell out the cash, only CompuServe will do. You can access Trademark-Scan and the Patent Research Center, get demographic data from Supersite, scan newspaper archives, and dig up company information from a wide range of sources.

But most of the action on CompuServe is found in its forums, which are a combination of message boards, conference rooms, and file libraries. Here you'll find technical support forums for hundreds of hardware and software vendors. You might even get a faster response on CompuServe than you would by calling a tech support line.

As with AOL and Prodigy, CompuServe's forums are home to clubs, hobbyists, and professional organizations. But unlike with AOL, you can't do anything else online—say, retrieve your e-mail—when you're in a forum. (A new version of the CompuServe software, due out later this year and slated to be integrated into Windows 95, will allow you to multitask.)

Otherwise, CompuServe handles e-mail and forum messaging very well. The address book is easy to use—just click on a message's return address to add the sender to your file. On the other hand, CompuServe's CB Simulator chat feature is a far cry from AOL's easy-to-use People Connection. However, you can also use almost any forum's chat feature to converse with anyone else who's in the forum at that time, using a real name or an alias.

Net Surfin' Turf

When it comes to Net surfing, CompuServe gives AOL a ride for its money. Like AOL, CompuServe's new browser is Explorer, though you can also use Netscape Navigator. Using other third-party Internet tools is fairly simple.

CompuServe has better tools for searching newsgroups than AOL, but its interface is more complicated. Also unlike AOL, CompuServe won't decode binary files or let you shuttle files across the service's Internet gateway. You'll be stuck sending text-only messages to your colleagues on the Net.

ONLINE SERVICES FOR EVERYBODY

Which online service is best? It depends on what kind of user you are and what online experience you want.

User	Needs	Best service	Best plan
Novice	e-mail for self and friends; access occasional news and encyclopedias	Prodigy	Basic
Entrepreneur	extensive business research; online more than 2 hours a day	CompuServe	Super Value plus premium databases
Social butterfly	meet people of common interests; online at least 1 hour a day	America Online	20/20
Technogeek	PC technical support, advice, shareware	CompuServe	Standard plus tech support databases
Ozzie and Harriet	family-oriented content; online no more than 2 hours a day	Prodigy	30/30
Frequent flyer	access e-mail, news, financial data while traveling internationally	CompuServe	Super Value
Would-be Netizen	Web surfing, newsgroup reading, e-mail; Net access more than 10 hours a month	Internet service provider	provider that offers flat rate; unlimited access

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Circle 242 on reader service card

Access Powers

CompuServe is the only major service that lets you log on with an ordinary terminal program or a shareware package such as TAPCIS or CISOP. But you'll find it a lot easier to use WinCIM, CompuServe's Information Manager for Windows .

WinCIM presents CompuServe's information in a more graphical way. But while some menus offer graphics, buttons, and hot spots, others are mere dialog boxes with a list of options. Still other menus are awkward hybrids of the two styles. And WinCIM windows sometimes minimize and restore themselves as you move around the service. Overall, the interface is functional but not as elegant as AOL's.

On the plus side, CompuServe has a broader network of international dial-up access points than anybody, and most access numbers support connection speeds up to 28.8 kbps. As with AOL, users who already have an ISDN or T1 line can connect to CompuServe using Internet protocols.

CompuServe is not for casual tourists. But if you're a business traveler with an online expense account, it's the only way to fly.
CompuServe, 800/848-8199
Reader service no. 801

PRODIGY

Jungle Boat Ride

Prodigy is the online equivalent of Disneyland's jungle boat ride. It gives you the look and feel of the Web, but the thrills are pretty tame.

Where the Web is unpredictable and chaotic, Prodigy is divided into neat categories with well-organized information and reliable links. And unlike the Web, with its rowdy and often X-rated sites, Prodigy is well policed and mostly PG (though lately it's been striking out into more "adult" territory).

One nice thing about Prodigy—an option no other online service provides—one account can include as many as six users, all of whom can be online at once. This makes it the best choice if, say, you want to download stock quotes to your laptop while your daughter uses Prodigy to do her homework. However, if you want serious reference information or a place where you can meet other people, then America Online and CompuServe are better choices.

A Family Affair

Despite Prodigy's attempts to attract a hipper audience, its top attractions are still what they've always been: great material for kids, students, and parents. It's got lively bulletin boards devoted to parenting, health, and home issues, plus in-depth news, financial data, and sports coverage. And advertisements—which used to appear at the bottom of almost every Prodigy page—are far less prevalent than they were a year ago.

COMPUSERVE HOT SPOTS

EXECUTIVE NEWS SERVICE. All the news that fits your tastes, downloaded each day. Surcharge $15 per hour. Go ens

GRAPHICS CENTER. A treasure trove of scanned images (beware, some of them are R-rated). Go graphics

KNOWLEDGE INDEX. Easy access to scores of academic, business, and legal data sources. Surcharge $21 per hour. Go ki

MAGAZINE DATABASE PLUS. A library of text articles from hundreds of publications. Surcharges vary. Go magdb

WUGNET. The Windows user group network is a great place to find undocumented tips and funky utilities. Go wugnet

TIME IS MONEY

CompuServe's and Prodigy's volume pricing plans offer the best deal for online fanatics. But for pure Net surfing, an Internet service provider is much cheaper.

	America Online		CompuServe		Prodigy		Internet service provider [1]
	Standard plan	20/20 plan	Standard plan	Super Value plan	Basic plan	30/30 plan	flat rate
Monthly subscription	$9.95	$19.95	$9.95	$24.95	$9.95	$29.95	$19.95
Hours included	5	20	5	20	5	30	unlimited
Cost per additional hour	$2.95	$2.95	$2.95	$1.95	$2.95	$2.95	0
Hourly surcharge for 800 number access	$6	$6	$6	$6	$6	$6	n/a
Hourly surcharge for int'l access	$6 to $24	$6 to $24	$0 [2]	$0 [2]	n/a	n/a	n/a
Surcharge for premium areas	$0	$0	varies	varies	varies	varies	n/a
Monthly bills including setup fees							
5 hours	$9.95	$19.95	$9.95	$24.95	$9.95	$29.95	$21.20
10 hours	$24.70	$19.95	$24.70	$24.95	$24.70	$29.95	$21.20
20 hours	$54.20	$19.95	$54.20	$24.95	$54.20	$29.95	$21.20
30 hours	$83.70	$49.45	$83.70	$44.45	$83.70	$29.95	$21.20
40 hours	$113.20	$78.95	$113.20	$63.95	$113.20	$59.45	$21.20
50 hours	$142.70	$108.45	$142.70	$83.45	$142.70	$88.95	$21.20
100 hours	$290.20	$255.95	$290.20	$180.95	$290.20	$236.45	$21.20

[1] Monthly average of six national providers for one year of service.
[2] For direct dial; $10 to $50 per hour via packet network.

n/a = not applicable

The Vision

EYE CONTACT

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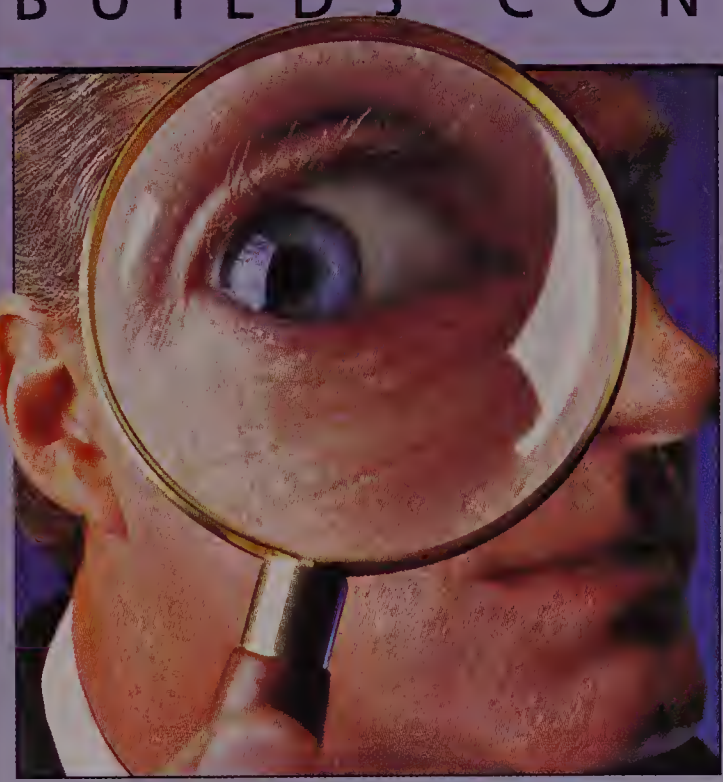

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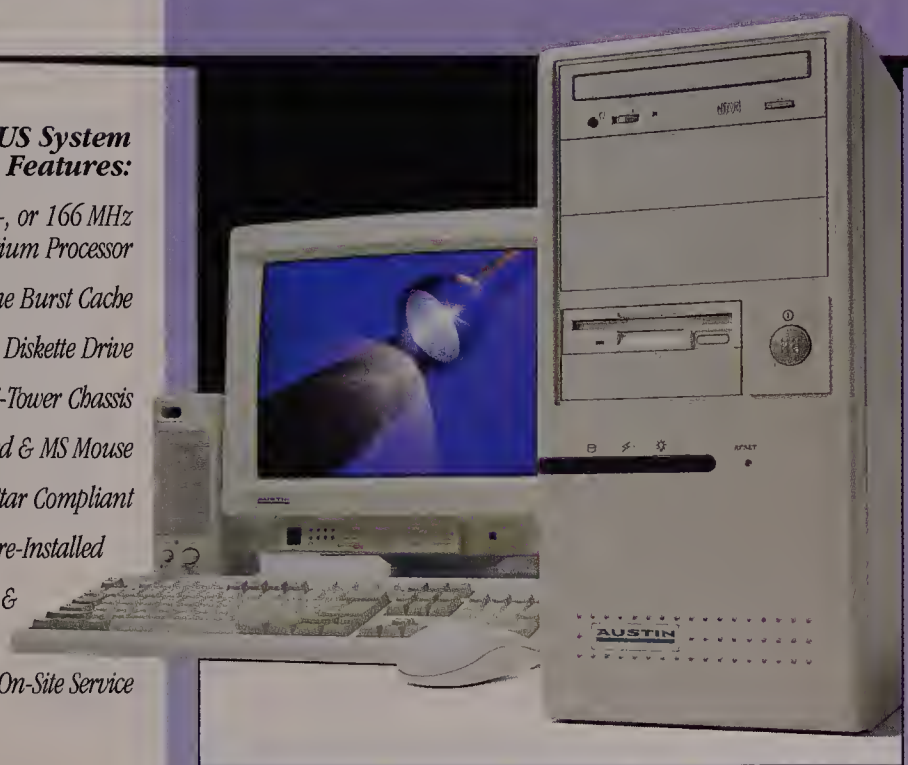

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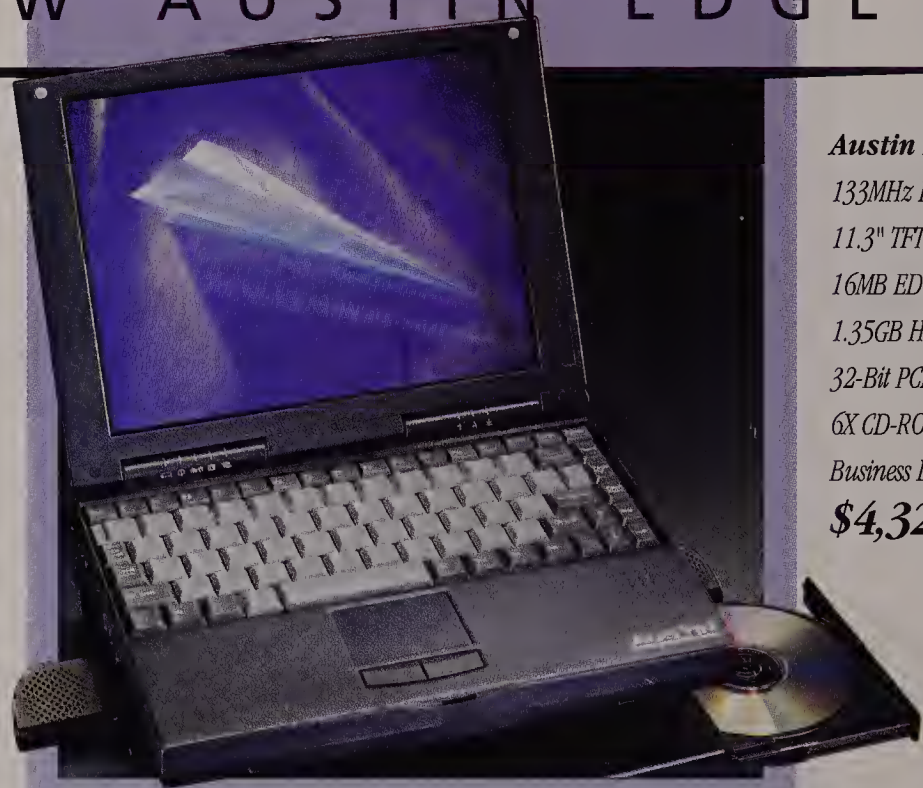

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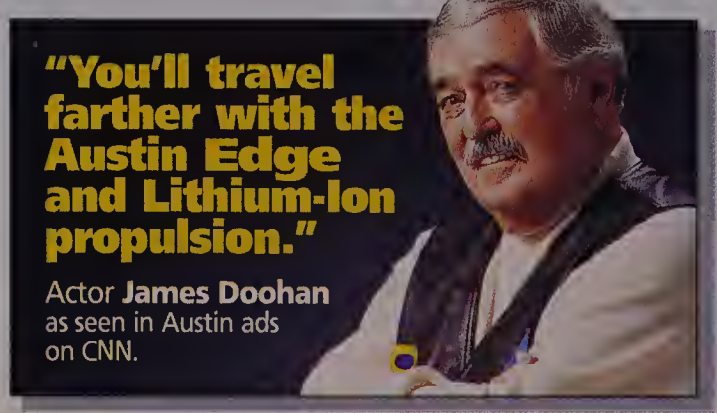

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Prodigy has some of the most innovative and least condescending children's content available, such as Sesame Street (for young children) and Nova (for older kids and teens). Homework Helper is a powerful reference tool that's easy to use and fun, yet sophisticated enough for adults.

Prodigy takes aim at a more cosmopolitan crowd with souped-up Web pages and a dose of humor.

In terms of content, Prodigy beats the pants off any online or CD-ROM encyclopedia. But Homework Helper is one of the few Prodigy Custom Choices that cost extra: You can pay $9.95 a month for 50 hours plus $2.95 per hour thereafter, or pay a flat $6 per hour.

The Home and Family category isn't all Ozzie and Harriet stuff, either: Prodigy recently introduced edgier material that's aimed at 20-somethings, and it's even developed a sense of humor. While a step in the right direction, it still seems a bit contrived at times—like Ozzie trying to act cool in front of Ricky and David's teenage friends.

Net Loss

Prodigy may look more Weblike than its two older rivals, but its browser and other Net tools have some growing up to do. A new version of Prodigy software, expected later this year, will feature Netscape Navigator as its primary interface.

The newsgroup reader is easier to use than CompuServe's, but it is not as straightforward as AOL's. The good news is that messages are alphabetized, threaded, and searchable by keyword. The biggest drawback is that it's slow and unresponsive.

PRODIGY HOT SPOTS

CHAT SOUP. A quasi-hip collection of Hollywood-style deep dish; also accessible via the Web. Jump chat soup

EASY SABRE. All three services let you make airline reservations, but Prodigy's Easy Sabre is the simplest to use. Jump sabre

HOMEWORK HELPER. This colorful site makes doing homework fun—well, almost. Surcharge $9.95 per month up to 50 hours, or $6 per hour. Jump homework

MARKET UPDATE. A graphical snapshot of the Dow Jones, NASDAQ, currency rates, and more. Jump markets

NEWSWEEK INTERACTIVE. Entertaining and informative, the digital version of *Newsweek* is one of the best electronic magazines going. Jump newsweek

You also can't send file attachments across Prodigy's e-mail gateway. And it can't decode binary messages—you'll have to use a third-party utility to unscramble the files.

Let's Chat

All three services offer live chat—where members can "converse" using their keyboards. But the differences in the kind of people you meet, and what you do, can be vast.

AOL Is for Lovers

When I entered AOL's People Connection as CyndiGirl1, a perky yet dim 25-year-old, I was swarmed by Instant Messages—all from guys. Some were friendly, some were scary; a few skipped the formalities entirely, inviting me to have cybersex. (No thanks, I just ate.) When I signed on as a guy, I got exactly zero Instant Messages. Stepping into a chat room is like entering the brain of a schizophrenic: Voices fly in every direction. But whether I was in Trivia Lite, the Spiritual Cookbook, or Starfleet Academy, the dialogues were indistinguishable—and banal. The closest I came to intelligent talk was in the Over 40 room, where an embittered divorcée griped about what beasts men can be. CyndiGirl1 would have to agree. —Daniel Tynan

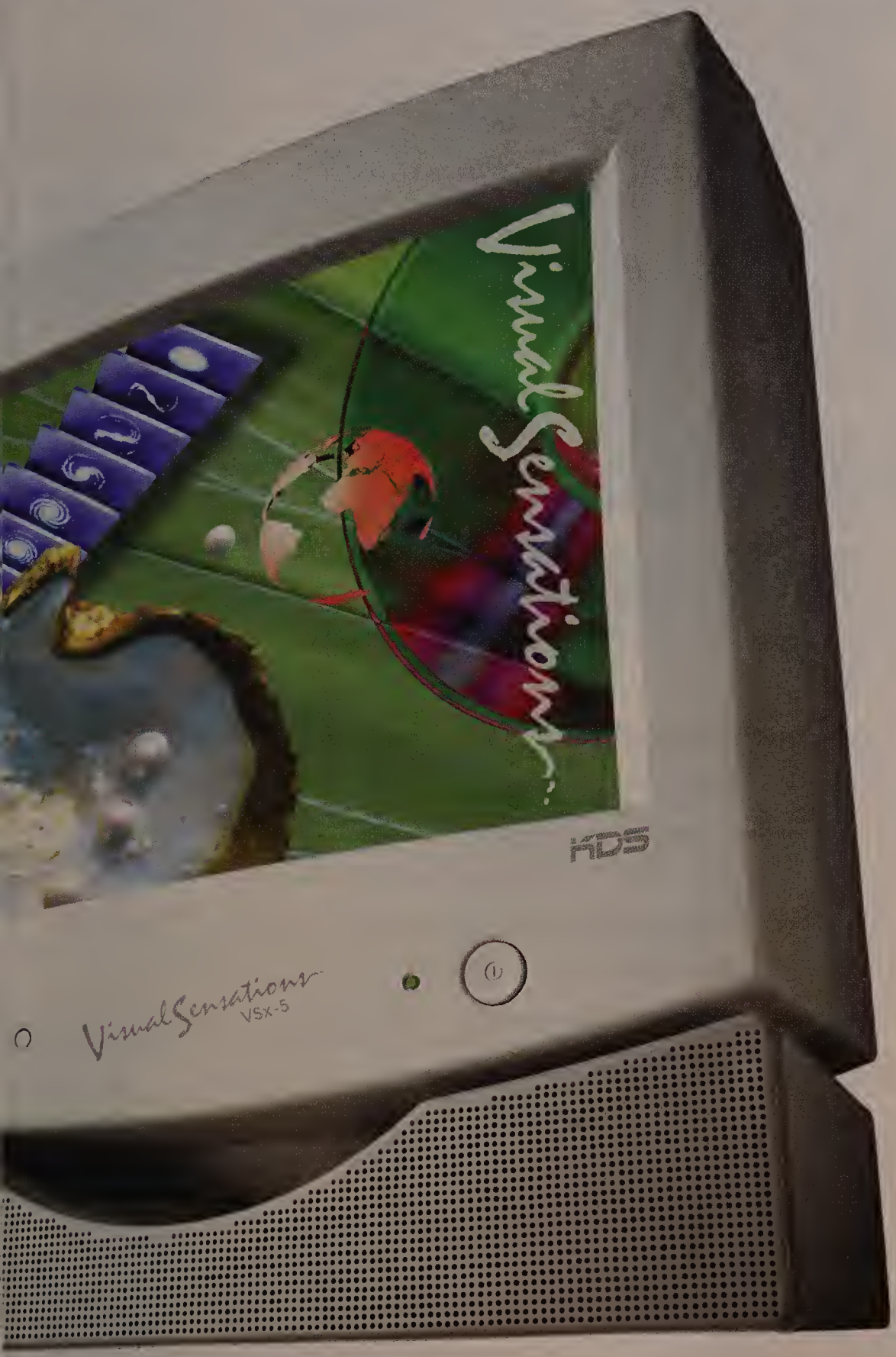
CompuNerd Central

Greta Garbo would have loved CompuServe's forums; they're perfect if you "want to be alone." Unlike America Online, CompuServe has no public chat center. Instead, you can try out CIS's hopelessly complicated (and sparsely populated) CB Simulator, or enter a forum and click on people's names to initiate private chats. But the forums are no-nonsense places, full of people looking for answers to tech questions or browsing for news, articles, and free stuff. Some members use forum nicknames, like "Busy—no chat," to deter potential chatters. One other difference from AOL: I entered dozens of forums, but not once did I get "buzzed" by other members, even though my nickname identified me as a woman. —Yael Li-Ron

Prodigy Family Values

I went into Prodigy's chat rooms expecting tame discussions about family values. What I found was something else indeed. Most of the rooms dedicated to special interest groups (sports, cooking, writing, and so on) were deserted when I visited them, but the seedier rooms were overflowing. The rooms weren't moderated, but an Alert button allowed me to complain to Prodigy officials if anybody misbehaved. Since I would have had to turn in 23 people, I opted instead to leave the room. Prodigy has been trying to go beyond its wholesome family image of late. I think it has succeeded. —Y. L-R.

Simply Sensational.



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Split Personality

If the name Prodigy still calls to mind chunky graphics and funny fonts, you should take another look. Over the past year the service has slowly but steadily undergone a makeover. Now a large part of Prodigy has a Web-like appearance, and many menu selections take you directly to Web sites. But clearly, it's still very much a service in transition.

In fact, you'll have to switch constantly between the traditional Prodigy window, with its configurable toolbar at the bottom, and the Prodigy Web browser, with standard browser controls at the top. To make matters worse, some of the content shown in the main Prodigy window looks like the Web, and some of it is still in Prodigy's old graphics format.

And Prodigy's interface, which actually consists of several separate applications, is maddeningly single-minded. If someone sends you an Instant Message, you can't talk to them and type text in a public chat room at the same time. If you're using the service's Web browser and you switch back to the main application, the browser closes. And, unlike CompuServe, Prodigy has no third-party interface alternatives.

Prodigy's e-mail is serviceable but slow. It, too, is a separate application, and it takes about 30 seconds just to open your mailbox. The e-mail interface is unattractive but relatively intuitive; however, you can't easily read or compose e-mail offline. Prodigy's bulletin boards are more usable than they were in past years, but they're still no match for CompuServe's. And the chat interface is cluttered, slow, and awkward.

Leisure Cruise

There is something to be said for Prodigy's older cartoonlike graphics: They download quickly, even at modem speeds of less than 9600 bps. Since Prodigy started providing limited 28.8 kbps access only this spring, download time is still an important issue with much of the service's offerings.

At press time, many Prodigy access numbers were still limited to 14.4 kbps. And if you want to connect to the service from anywhere outside North America, you have to do so via a long-distance call. (In mid-May, however, Prodigy' creators, Sears and IBM, sold it to an investor group headed by company management. The new owners may expand the service's international access, according to news reports.)

Prodigy works best if all you want to do is load up the virtual station wagon and head off on a family vacation. Just don't try to venture too far beyond its borders. *Prodigy Services, 800/776-3449*

Reader service no. 802

FEATURES COMPARISON How the Big Three Stack Up

General	America Online	CompuServe	Prodigy
Basic subscription/hours included	$9.95 /5	$9.95 /5	$9.95 /5
Maximum screen names per account	5 [1]	1	6
Toll-free number for tech support	●	●	●
Content			
Customizable news service	●	●	○
Local weather maps	○	○	●
Business and stock market info	●	●	●
Specialized business databases	○	●	○
Family-oriented content	●	●	●
Search across bulletin boards and software libraries	●	●	●
E-mail and chat			
Read/write e-mail offline	●	●	○
Maximum message size	32K [2]	2MB	32K
Check receipt status	●	●	●
Spelling checker	○	○	●
Address book/user directory	●/●	●/●	●/●
Send multiple files within service	○	○	●
Encodes/decodes attachments across Internet	●	○	○
Control access to chat area	●	●	●
Instant messaging	●	● [3]	●
Create public rooms/private rooms	●/●	○/● [4]	●/●
Internet features			
Provides Web browser	●	●	●
Supports third-party browser	●	●	○ [5]
Create list of bookmarks	●	●	●
Create personal Web pages	●	●	●
Maximum page-storage space per screen name	2MB	1MB	1MB
Newsgroup access	●	●	●
FTP, telnet, gopher services	●	●	●
User-customizable Winsock	●	●	○
Access			
Around the clock	○ [6]	●	○
Maximum modem speed (kbps)	28.8	28.8	28.8 [7]
Direct ISDN access/via TCP/IP	○/●	●/●	○/○
International	France, Germany, UK	Europe, Asia	○
Packet network	●	●	○
Multiple access profiles for logging in from different locations	●	●	○

[1] Only one screen name can log on at a time.
[2] Outgoing Internet messages only.
[3] Within forums only.
[4] Only as impromptu chats within forums.
[5] Netscape Navigator to be integrated in next version of Prodigy software.
[6] Occasionally offline 4 a.m. to 7 a.m. EST for maintenance.
[7] Limited to certain locations.

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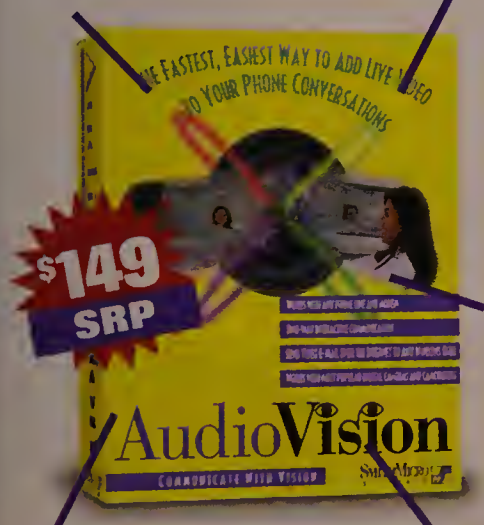

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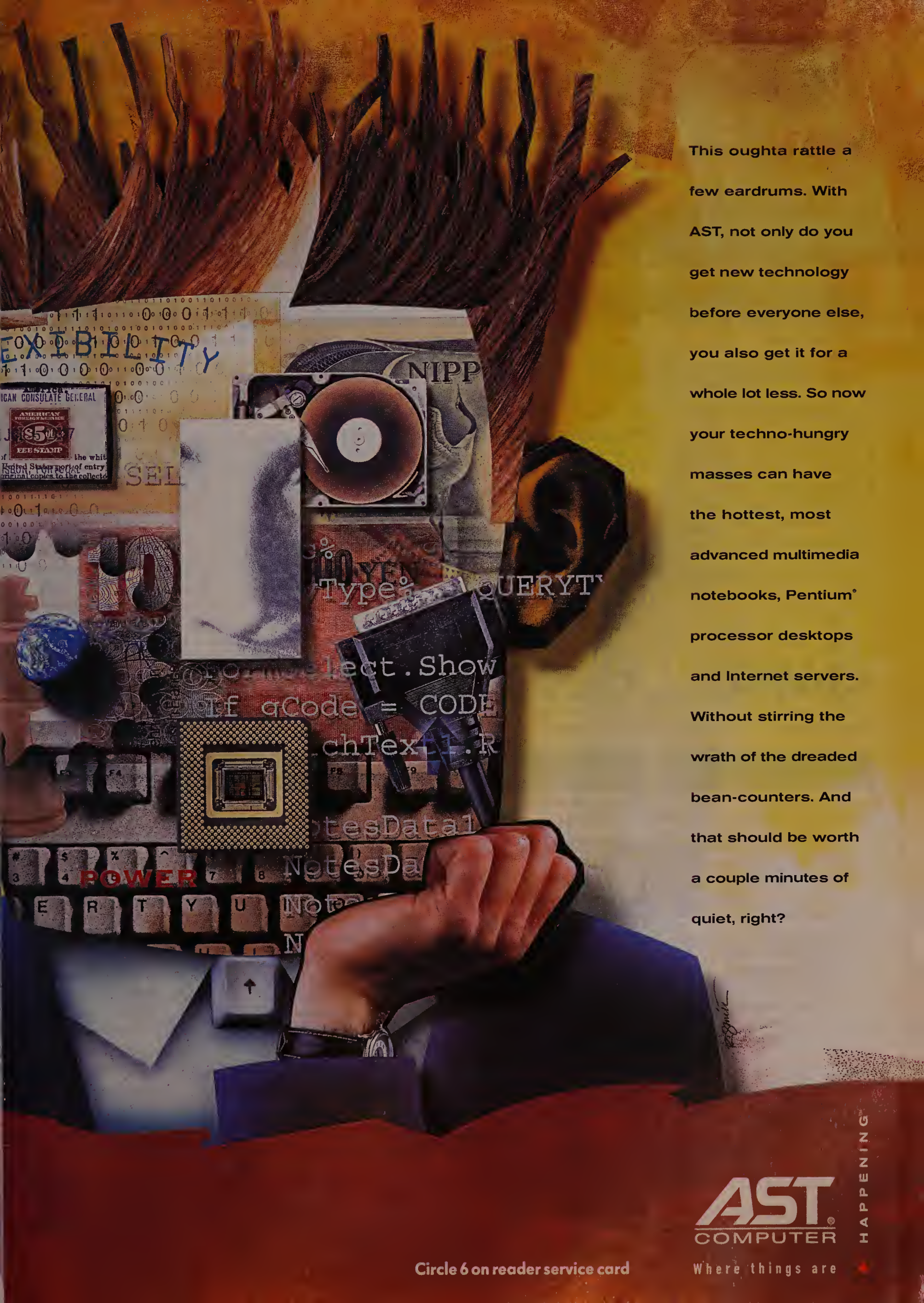

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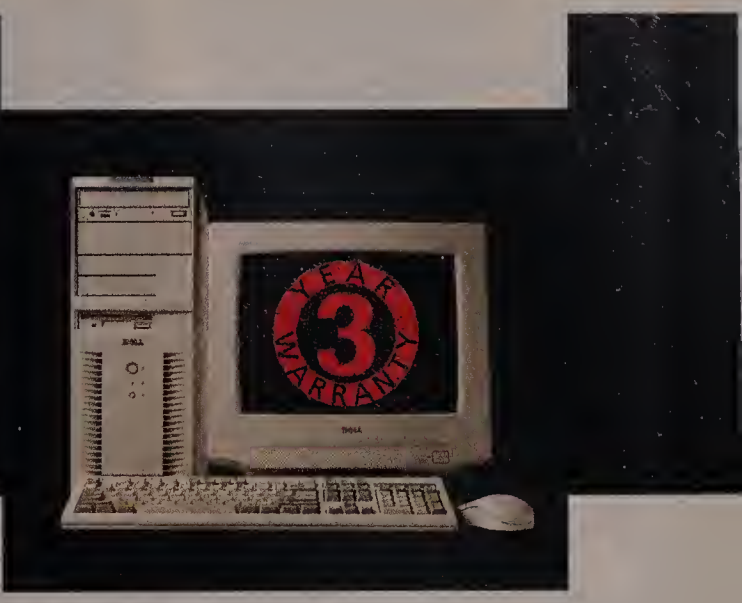

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ISDN modems give you fast Internet access and quick connections to office networks, but not without headaches. We tested eight models and managed to find two Best Buys.

BY PETE LOSHIN

This is the age of information: Whether on the road or at home, you can get late-breaking news over the Internet or download up-to-the-minute profit reports from your corporate server. But you're probably using nineteenth-century technology to access that information: the telephone. Most homes, hotels, and small businesses use aging analog lines tied to a digital telephone system. Designed for simple voice communications, analog lines start to choke when you push lots of data through them. It's like having a highway one mile from your house with a washboard dirt road leading to it.

U.S. Robotics Courier I-Modem With ISDN/V.34, IBM WaveRunner Digital Modem, and Adak 221.

Integrated Services Digital Network technology is far from ideal, but for now it is the best solution for paving a data onramp between the PC on your desk and the wealth of information online. The basic ISDN service gives you throughput up to 128 kbps; the typical analog modem tops out at 28.8 kbps. ISDN is digital, which makes perfect sense for linking computers: Your PC is digital; the phone network is digital; any computer network you'd connect to is digital. Shouldn't your modem also be digital?

To answer this question, we looked at eight ISDN modems (or terminal adapters) from Adak, Adtran, Digi International, IBM, ISDNtek, Motorola, and U.S. Robotics. We found a wide range of prices and features, but mostly we discovered that these devices are quite difficult to install. All eight modems required calls to technical support before we were up and running.

We looked at the 3Com Impact ISDN Modem and were impressed by its ease of use. However, the manufacturer wasn't sure if this model would be available at press time. 3Com plans to ship a new model this summer that will feature, among other things, an automated wizard to ease installation and use.

There's a new crop of ISDN modems due out this summer—including units from Adtran, Boca Research, Cardinal, Diamond Multimedia, Farallon, Multi-Tech, and ZyXel—that should not require a degree in computer science to set up.

Of the units we tested, the Motorola BitSurfr Pro and the U.S. Robotics Sportster ISDN 128K emerged as Best Buys for their ease of use and great performance. A close contender was the U.S. Robotics Courier I-Modem, which offered both digital and analog access. But its high price and average performance kept it from the top spot. At the rear of the pack were units from Adak, Adtran, Digi International, IBM, and ISDNtek. These modems were difficult to install and floundered in our remote access tests.

Preparing for the ISDN Connection

Unlike with an analog modem, which you can typically just plug in, you'll have to do some homework before you purchase an

ISDN modem. First, your modem can connect only with another ISDN modem, so you'll have to make sure that the sites you plan to contact have them. Currently, CompuServe offers ISDN access via an 800 number and will roll out local ISDN service for 11 selected cities by August. The Microsoft Network provides ISDN service across the United States, and Prodigy is testing ISDN access in selected areas. America Online does not yet offer ISDN but may do so in the future based on customer demand. If you're in the market for faster Net access, ask your Internet service provider whether it offers ISDN service, and also find out which ISDN modems it currently supports.

Second, make sure your communications software supports ISDN. Most terminal emulation programs, such as HyperTerminal, and remote access software, including pcAnywhere and LapLink, support ISDN.

Next, call your local phone company and make sure ISDN is available in your area. This is a problem that has dogged the technology for years. If you live outside a major metropolitan area, chances are that your phone company cannot provide ISDN service. If it does offer ISDN, request the Basic Rate Interface service, which provides two 64-kbps "B" channels for voice and data. ISDN BRI is ideal for the home or small business because you can use one line for data and the other for phone and fax. You can expect to pay between $30 and $200 for installation, and monthly charges can run anywhere from $30 on up; the exact price will vary based on where you live.

Finally, ISDN modems also require a Network Terminator, or an NT 1. This unit mediates between the ISDN line and your PC. In the past, ISDN modems required a separate NT 1, but most now come with the NT 1 device built into the unit. Of the modems here, only the IBM WaveRunner Digital Modem required a separate NT 1.

The Trials and Tribulations of ISDN

One thing is for sure: Installing an ISDN modem is not for the squeamish or casual user. We ran our tests under Windows 95, but none of these modems shipped with the files we needed to just plug and play. In nearly all cases we had to track down device drivers, configuration files, and command strings to get the modems up and running.

But our work was not finished once the units were installed. We then had to get the modem and ISDN phone service on speaking terms. To do so, we had to configure the modems using information supplied by the phone company. This included specifying the type of switch used at the phone company's central office and entering the Service Profile ID (SPID) assigned to each data channel.

Best Buys

The U.S. Robotics Sportster ISDN 128K stood out for its performance, ease of use, all-around flexibility, and reasonable price. Although the Sportster was unable to complete our file transfer tests, it blew away the competition in our remote access tests, making it an ideal choice for telecommuters. The Sportster was a dream to install—you simply plug it in and go—and has an analog jack for plugging in a telephone or fax machine.

It was a tight race between the U.S. Robotics Courier I-Modem With ISDN/V.34 and the Motorola BitSurfr Pro, because both are easy to install and use. In the end, however, the BitSurfr's combination of lower price, better performance, 5-year warranty, and generous tech support earned it our Best Buy.

Motorola BitSurfr Pro and U.S. Robotics Sportster ISDN 128K.

Testing ISDN Speed

The PC World Test Center ran two tests to measure ISDN modem speed, both based on file transfers. First we dialed in to a remote NetWare server and sent and received e-mail with various types of file attachments. Then we transferred files between two PCs using Symantec's pcAnywhere.

Internet testing was conducted in our Boston office using a more subjective approach. Our first test was to connect to the Internet via an account provided by PSINet. Once connected to the Net we performed routine tasks such as sending and receiving e-mail, browsing Web sites, and downloading a variety of graphics and text files that were about 1MB each.

When downloading files, we could expect a transfer rate between 40 and 50 kbps. In some cases we were able to combine both B channels for throughput up to 100 kbps, but we couldn't sustain such a rate for any substantial period of time. We did notice, however, that we were able to maintain our connections to the Web for hours.

ISDN Redux

It's clear that ISDN modems still have a way to go before they match the ease of use of analog modems. But it's also clear that you can make up for lost productivity fairly quickly with the performance you'll gain. In situations where you can control the hardware and software at both ends of a connection, such as telecommuting, you'll benefit from ISDN. In situations where you don't have as much control, such as when you connect to the Internet, improvement will not be as dramatic, but an ISDN modem will still surpass the current transfer rates of an analog modem. In any case, plan to spend plenty of time getting your ISDN line installed and your hardware set up before you can reap the benefits of the new digital frontier.

Pete Loshin is a freelance writer in Watertown, Massachusetts.

For more information about all products in this article, circle reader service no. 910.

Adak 221

PROS: Flexible setup options, optional battery backup
CONS: Confusing and complicated configuration

If you have complex communications needs, the Adak 221 may work for you—as long as you are technically astute or have reliable help from your company's IS department. With two serial port connectors, a digital port, and two analog ports, you can hook up your entire home or small business through this $999 box.

But we found that setting up all these connectivity options was particularly complicated—sort of like trying to set up a VCR with a bunch of different instruction books. To set up the Adak, you have to configure each serial port separately, and an incorrect answer to one of the many configuration options will stop you cold. (Most of the modems we tested had this problem.) There is one saving grace: The Adak 221 comes with remote configuration and diagnostic tools, so the modem can be supported by an ISDN expert back at the office.

We were disappointed in the Adak 221's performance. Although the modem supports Multilink PPP, we were only able to establish a connection on one channel. Small wonder, then, that it was the slowest modem in remote access. (Adak says that an update to the modem's firmware will soon be released to correct this problem.) In our file transfer tests, however, the Adak did considerably better, tying with the Adtran ISU Express and coming only seconds behind the U.S. Robotics Courier I-Modem.

Considering the installation difficulties, it's troubling that Adak's tech support is among the skimpiest here; the company does not provide a toll-free number and offers only 9 hours of weekday support. *Adak Communications Corp., 517/882-5191, http://www.adak.com* **Reader service no. 745**

Adtran ISU Express

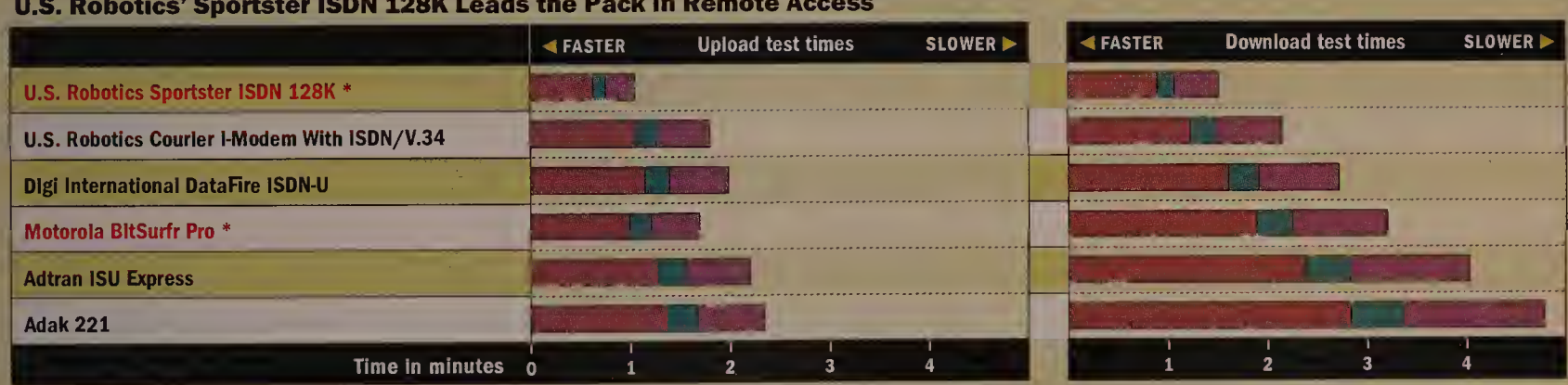
PROS: Remote configuration, 7-day 24-hour tech support call-back service
CONS: Clunky installation and configuration, poky remote networking performance

At first glance, the $595 Adtran ISU Express looks like a less-expensive version of the U.S. Robotics Courier I-Modem. Both have lots of status lights on the front panel for quick troubleshooting. But that's where the similarly ends. The ISU Express was far more difficult to set up, and it was relatively slow in our remote access tests. We'd pass on this model.

This summer Adtran will ship the ISU Express XR and the ISU Express XRT. These updated models will attempt to ease installation with an Express Wizard that automatically configures the modem for you by autosensing SPID and switch information directly from the ISDN line.

TEST REPORT ISDN Modems Boost Telecommuting Performance

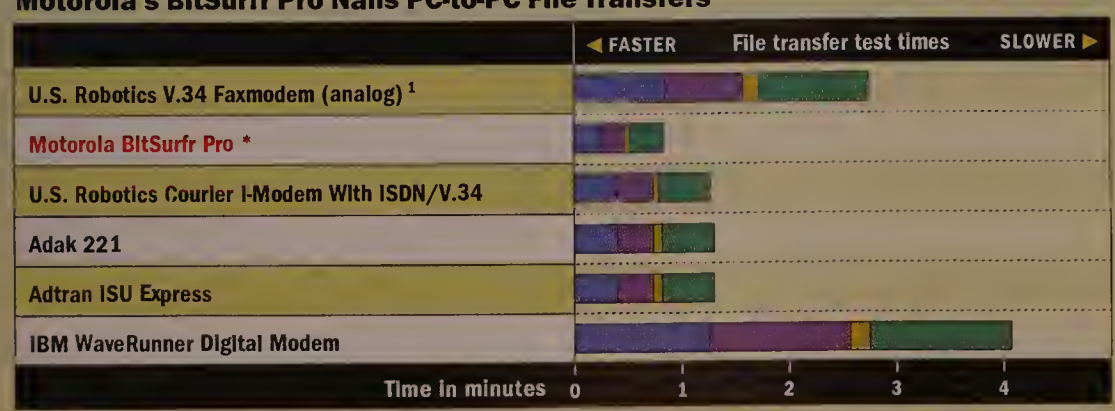
U.S. Robotics' Sportster ISDN 128K Leads the Pack in Remote Access



416K word processing file 167K graphics file 203K executable file

The IBM WaveRunner Digital Modem and ISDNtek CyberSpace Commuter Plus Card were unable to complete the remote access tests.

Motorola's BitSurfr Pro Nails PC-to-PC File Transfers



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The Digi International Datafire ISDN-U, ISDNtek CyberSpace Commuter Plus Card, and U.S. Robotics Sportster ISDN 128K do not support the V.120 protocol and so were unable to complete our file transfer tests.

[1] For comparison purposes.

* Best Buy

Methodology

PC to Network We tested remote access performance using the 3Com AccessBuilder 4000 remote access server with integrated ISDN BRI and a simulated 2000AF ISDN Central Office network from Merge Technologies. The server was a Dell Pentium Pro-150 running Novell NetWare 3.12. The client was a Micron P-90 running Windows 95. Our e-mail system was Lotus cc:Mail 2.21 for Windows.

We made three calls from the client to the NetWare server through the 3Com AccessBuilder 4000. We measured the time it took to send and receive e-mail messages with word processing, graphics, and executable files attached (one file type per message).

PC to PC We used a pair of Micron P-90s running Windows 95 and equipped with identical ISDN modems.

We used pcAnywhere for Windows 95 with compression enabled to place a call to a PC, then transferred word processing, spreadsheet, graphics, and executable files. We measured the time it took to complete the file transfer.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

On a more positive note, Adtran has the most generous technical support program of any of the modem vendors reviewed here, offering 12 hours of weekday support and 9 hours on Saturday. In addition to its toll-free support line, the company also provides a 7-day, 24-hour emergency call-back service. *Adtran, Inc., 800/923-8726, 205/971-8000, http://www.adtran.com* **Reader service no. 746**

Digi International DataFire ISDN-U

PROS: Automatically disconnects a line after transmission ends, supports Windows 95 TCP/IP stack
CONS: Complicated installation, no analog ports, does not support Multilink PPP

If you need quick access to your office network or want to browse the Internet, you might consider the $595 DataFire ISDN-U. But if you're looking for a single telecommunications solution, you'll have to go elsewhere. The DataFire does not include an analog port, so you can't make any telephone calls with this device.

The DataFire is an internal card that comes with an impressive collection of operating system and network drivers. It also supports the Windows 95 TCP/IP stack, so you won't have to purchase additional software to access the Web. It's not the easiest modem to install, but it is manageable for someone who is familiar with setting up PC hardware. After using the DataFire's cryptic utility to install the drivers for Windows 95, we found that they didn't work. We had to download new drivers from Digi International's Web site before we could dial out.

The DataFire does not support Multilink PPP or V.120, the protocol used by many PC communications programs, so we were unable to complete the file transfer tests. In the remote access tests, the DataFire was the third fastest, following directly behind the two U.S. Robotics products, with a total transfer time of 4 minutes, 42 seconds.

Digi International's documentation is fairly comprehensive and readable, but if you need additional help getting the DataFire ISDN-U up and running, it will cost you: The company doesn't provide a toll-free technical support number. *Digi International, 800/344-4273, 612/943-9020, http://www.digibd.com* **Reader service no. 747**

IBM WaveRunner Digital Modem

PROS: Includes handset phone jack
CONS: Nightmarish installation process, does not support Multilink PPP

The IBM WaveRunner Digital Modem is unique for a number of reasons: It's the only internal unit we reviewed that includes both a handset phone jack for digital voice calls and a 14.4-kbps analog fax-modem for connecting to fax machines and standard analog devices. It's also the only ISDN modem that does not support Windows 95—and it has the dubious distinction of being the only one that requires a separate NT 1. The WaveRunner's $511 price is average, but after you buy the NT 1, you'll have tacked on about another $150.

We found a lot to dislike about the WaveRunner's installation. For example, you have to configure the board before you install it, and you're on your own for figuring

Master the ISDN Lingo

For the typical PC user, one of the biggest stumbling blocks to ISDN technology are the special terms that come with the territory. The following is a list of the most common terms you'll see, along with their meanings.

Analog port The standard RJ-11 jack that analog devices such as phones, fax machines, and modems plug in to.

BONDing From Bandwidth on Demand, this describes a proprietary protocol implemented in the hardware that is used to combine both B channels to form a single 128-kbps connection. ISDN modems at both ends of the connection must support BONDing to achieve the combined throughput.

BRI The Basic Rate Interface is the most common ISDN service for individuals and small offices. It comprises two B channels, each of which can carry up to 64 kbps of voice or data, and one D channel that carries 16 kbps of signaling information.

Dynamic Bandwidth Allocation A feature that drops one of two B channels being used for a data connection and automatically gives that channel to an incoming voice call or an outgoing call without disrupting the data connection. When the call is completed, the second B channel is then reassigned to the data connection.

ISDN The Integrated Services Digital Network uses two or more 64-kbps B channels to carry data, digitized voice, or video across digital phone lines at high speeds.

Multilink PPP Multilink Point-to-Point Protocol is a multiconnection protocol that lets you bind the two B channels together for a combined throughput of 128 kbps on a single call. Unlike BONDing, Multilink PPP is implemented in software and requires only that your communications software support the protocol.

NT 1 The Network Terminator is a device that stands between the ISDN network and your PC. Many ISDN modems include an integrated NT 1, while others require an external unit. If you need to hook additional devices to your ISDN line—such as multiple PCs or a digital phone—then purchasing a separate NT 1 device can make it easier.

PPP The Point-to-Point Protocol governs the way computers connect to networks over a direct link such as a phone line. PPP is the standard for communications with your Internet service provider, as well as for many remote networking clients.

PRI The Primary Rate Interface consists of 23 B channels and a single D channel. PRI is geared for large companies that may have multiple users calling a network server or phone system at one time.

SPID The Service Profile ID is a unique number assigned by the phone company to an ISDN modem. Depending on the type of service and your provider, a separate SPID may also be assigned to each B channel.

Switch This is the device used by your local ISDN service provider to connect callers to circuits. There are four common switches in use in North America today: AT&T 5ESS, Northern Telecom DMS 100, National ISDN-1, and Siemens EWSD.

V.120 A protocol that allows devices that communicate at speeds of less than 64 kbps to adapt their rates to fill an entire 64-kbps B channel. Many PC communications products require support for the V.120 protocol in order to connect.

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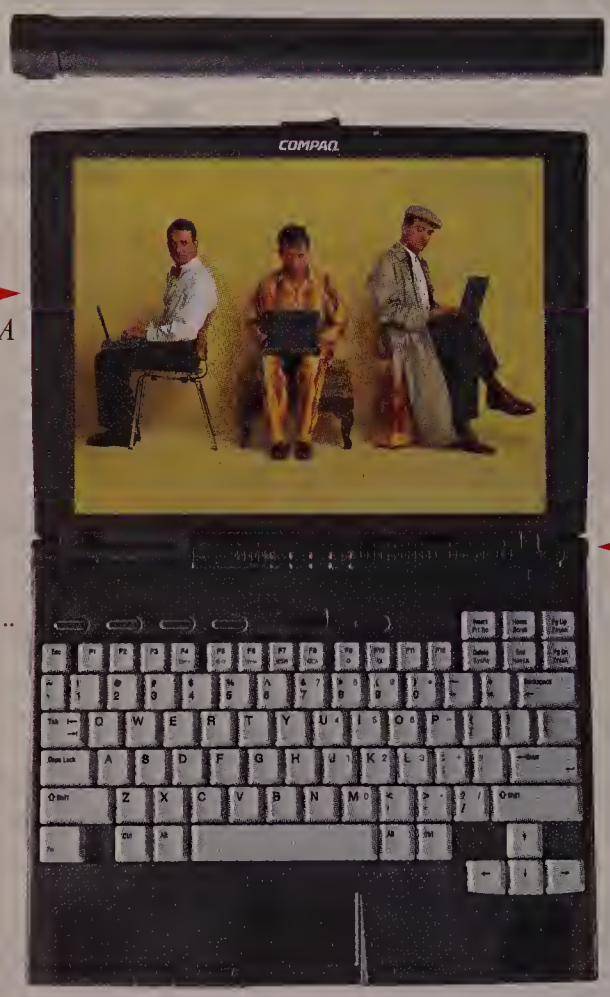

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out the right hardware interrupts. The worst part of all is that you have to enter ISDN switch types and SPIDs twice: once for the NT 1 and again for the WaveRunner itself.

The WaveRunner was the only internal modem able to complete our file transfer test, but it was way off the mark. It took over 4 minutes to complete what the next slowest modem did in just under a minute and a half. The WaveRunner was unable to complete our remote access tests because it only supports remote access hardware from IBM.

IBM offers one of the more generous tech support polices, with a toll-free number, 12 hours of weekday support, and 5 hours on Saturdays. But only the staunchest Big Blue supporter should buy this modem. *IBM, 800/426-2255, http://www.raleigh.ibm.com*

ISDNtek CyberSpace Commuter Plus Card

PROS: Includes phone dialing utility
CONS: Complicated installation, no analog ports, does not support Multilink PPP

We were disappointed with the CyberSpace Commuter Plus Card. Although it can connect to the Internet, it was unable to complete our file transfer and remote access tests. An internal card, this modem was tough to install—and it's no great value at $795.

Two positive notes are that ISDNtek bundles NetManage Chameleon with the modem, so you won't have to purchase additional software to access the Internet. And although the Commuter Plus Card doesn't have any ports for attaching analog devices, it does include a handset jack and a bundled dialer program for making digital voice calls. We found that the Phone Dialer application should suit most of your calling needs, but you must have the application running to handle incoming calls.

We were unable to run either our remote access or file transfer tests with the Commuter Plus Card. Like the Digi International DataFire and the U.S. Robotics Sportster, the Commuter Plus Card does not support V.120, so we couldn't get it to work with pcAnywhere. In addition, the test unit we looked at did not ship with drivers for Windows 95 or NT, so we were unable to connect to our remote access server. According to ISDNtek, these drivers should be available sometime this summer. (We connected to the Internet using a beta version of a Windows 95 driver.)

ISDNtek provides the same minimal support policy as Adak, offering only 9 hours of weekday support and no toll-free support number. *ISDNtek, Inc., 415/712-3000, http://www.isdntek.com* **Reader service no. 748**

Motorola BitSurfr Pro

PROS: Painless installation, two analog ports, optional battery backup
CONS: Complicated configuration for Windows 95 TCP/IP stack

At $495, the Motorola BitSurfr Pro has the lowest price of the modems we reviewed—not much more than you'd spend on a 28.8-kbps modem. With its sleek black case (also available in purple), this external unit is definitely the most stylish of the group. It is also fairly quick, is easy to set up, and has a nice combination of features. It's one of the best overall values here—good for Net surfers and telecommuters alike—and is our first Best Buy.

Installation was about as easy as it gets for these devices. We had some initial problems, but once we received updated drivers it was only a few minutes until we were on the Internet. (The new drivers shipped shortly after we tested the modem.) Getting Multilink PPP running was a bit harder than we would have liked: We had to enter a long string of modem commands in Windows 95's Modem Device Configuration Panel before we could get it to work.

Our remote access tests yielded mixed performance results for the BitSurfr Pro. Its total transfer time of 4 minutes, 54 seconds was about 3 seconds faster than the average for the group. (It tended to be faster uploading files than downloading them.) In our file transfer tests, however, the BitSurfr Pro had the fastest transfer time.

The BitSurfr's documentation is adequate, but it could be better organized. Fortunately, Motorola's support policies are second only to Adtran's. Motorola offers a toll-free support line and 12 hours of daily support with a call-back service on the weekends. *Motorola Transmission Products Division ISG, 800/426-6336, 205/430-8000, http://www.mot.com* **Reader service no. 749**

Clockwise from upper left: Digi International DataFire ISDN-U, Adak 221, ISDNtek CyberSpace Commuter Plus Card, Adtran ISU Express.

U.S. Robotics Courier I-Modem With ISDN/V.34

PROS: Easy to set up, includes built-in V.34 analog fax-modem, remote configuration
CONS: Doesn't support Multilink PPP

If you're looking for a fairly complete communications solution, consider the Courier I-Modem With ISDN/V.34. Priced at $795, it is fast, flexible, and nicely designed. Its only major flaw is that it does not support Multilink PPP, which would give it even better performance. (At press time, U.S. Robotics announced the availability of Multilink PPP for the I-Modem.) The I-Modem includes a V.34 analog modem and a single analog port for attaching devices such as a phone or fax machine.

The Courier I-Modem was the easiest of the units to set up; we experienced only a few minor glitches, which were cleared up with a quick call to tech support. We were also impressed by the I-Modem's perfor-

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mance: It came in second only to the U.S. Robotics Sportster. Transferring the three files in our remote access test took about a minute less than the average of all the modems. In our file transfer tests, the I-Modem came in second fastest—just behind the BitSurfr Pro.

U.S. Robotics doesn't provide a toll-free support number and offers only 10 hours of weekday support. But the documentation it provides is better than that for most of the competing products. Considering the Courier I-Modem's speed and relatively easy installation, we could live with the limited support hours. *U.S. Robotics, 800/550-7800, 847/982-5151, http://www.usr.com* **Reader service no. 750**

U.S. Robotics Sportster ISDN 128K

PROS: Good performer, supports Multilink PPP, includes analog device port

CONS: Doesn't work with Windows 95 TCP/IP stack, doesn't support V.120 protocol

The U.S. Robotics Sportster ISDN 128K is fast, relatively cheap, and—most important for the average PC user—fairly easy to install. It's an internal card that costs $549. Like the other internal modems, our Sportster did not support remote file transfer applications, but it did let us connect to a remote network and access the Internet. This second Best Buy is still not ideal, but considering the problems we had with the other modems, it's the one we would consider if we were spending our own money.

The Sportster is the only internal modem we reviewed that has an analog port for phones, fax devices, or answering machines. To install the Sportster we simply plugged it into our PC. Configuring it took even less time; once we entered the ISDN switch type and SPID number we were ready to roll. However, the Sportster doesn't support the Windows 95 TCP/IP stack, so you must have your own software to browse the Web.

We had no complaints about performance. The Sportster transferred our three files in 2 minutes, 34 seconds—1 minute, 23 seconds faster than the number two I-Modem. The documentation was a cut above average and included a book on using the Web. *U.S. Robotics, 800/877-2677, 847/982-5151, http://www.usr.com* **Reader service no. 751**

FEATURES COMPARISON Motorola and U.S. Robotics Make the ISDN Connection

● = Yes ○ = No
n/a = not applicable

Standard features	Adak 221	Adtran ISU Express	Digi International DataFire ISDN-U	IBM WaveRunner Digital Modem	ISDNtek CyberSpace Commuter Plus Card	Motorola BitSurfr Pro	U.S.Robotics Courier I-Modem With ISDN/V.34	U.S.Robotics Sportster ISDN 128K
List price	$999	$595	$595	$511	$795	$495	$795	$549
Interface(s)	external	external	internal, PC Card	internal	internal	external	external, internal	internal
Protocols	Multilink PPP, PPP, V.120	BONDing, Multilink PPP, PPP, V.120	PPP	PPP, V.120	PPP	BONDing, Multi-link PPP, PPP, Sync PPP, V.120	PPP, V.120	Multilink PPP, PPP
NT 1 included	●	●	●	○	●	●	●	●
Bundled software	○	○	○	Trio DataFax Lite, TurboCom	NetManage Chameleon	HyperAccess, NetManage Chameleon, TurboCom/2	QuickLink II	○
RJ-11 analog device ports	2	1	○	○[1]	○[1]	2	1	1
Analog modem speed (kilobits per second)	n/a	n/a	n/a	14.4	n/a	n/a	33.6	n/a
Power switch	○	○	○	○	○	○	●	○
Remote configuration	●	●	○	○	○	○	●	○
Software-upgradable firmware	●	●	○	●	○	●	●	○
ISDN switch types supported	AT&T 5ESS, National ISDN-1, Northern Telecom DMS 100	AT&T 5ESS, National ISDN-1, NEC, Northern Telecom DMS 100	AT&T 5ESS, National ISDN-1, Northern Telecom DMS 100	1TR6, AT&T 5ESS, National ISDN-1, Northern Telecom DMS 100, VN4	AT&T 5ESS, National ISDN-1, Northern Telecom DMS 100	AT&T 5ESS, National ISDN-1, Northern Telecom DMS 100	AT&T 5ESS, National ISDN-1 and -2, Northern Telecom DMS 100	AT&T 5ESS, National ISDN-1 and -2, Northern Telecom DMS 100
Service and support								
Warranty (years)	1	5	5	1	1	5	2	5
Toll-free support	○	●	●	●	○	●	○	○
Daily support (hours)	9	12[2]	10.5	12	9	12	10	10
Weekend support	○	●[3]	○	●[3]	○	call-back	○	○

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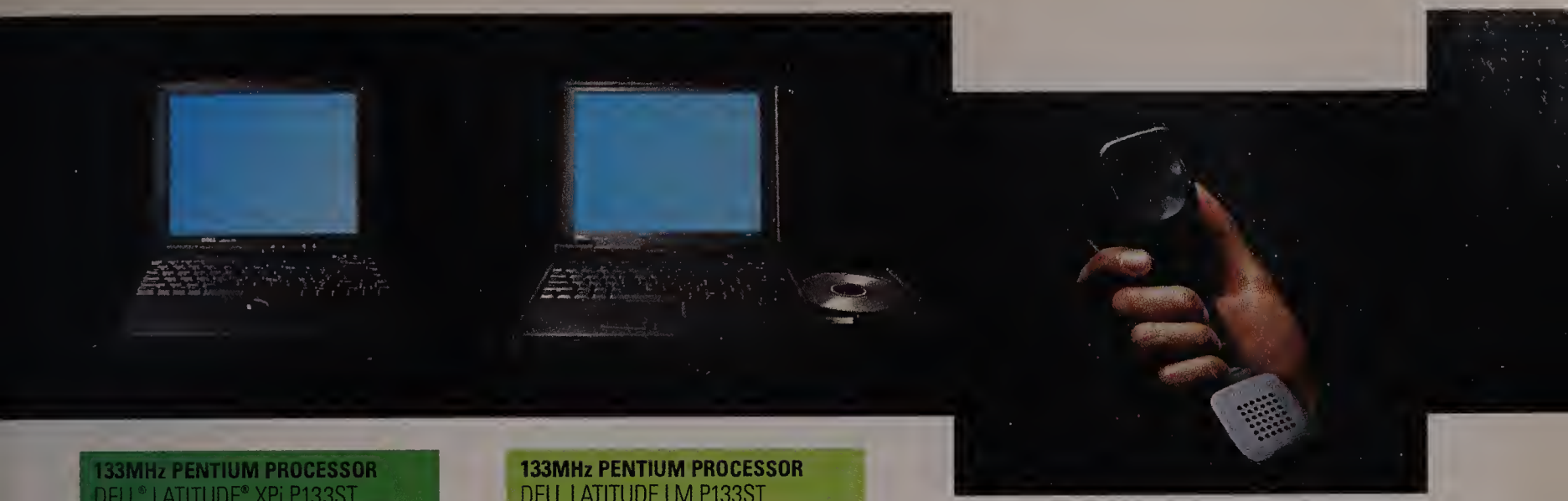

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WHAT YOU CAN AND CAN'T GET AWAY WITH ONLINE

Even the lawyers can't agree on what's legal. For now, assume that if it's illegal offline, it's illegal online.

BY ROBERTA FURGER

In an online forum, how much can I say about the quality of a company's products or an executive's actions without getting sued for libel?

Can I legally reuse the text and graphics I find online in a presentation I'm delivering?

I know there are laws about being harassed on the telephone, but do I have any protection from online harassment?

The rapid expansion of electronic communications and the corresponding growth of the Internet have raised complex legal questions, both for companies looking to develop an online presence and for individuals charting their own path in cyberspace.

Unfortunately, the most anyone can do right now is speculate about how current laws will be applied to the online world. In virtually every area of concern—from copyright and libel to free speech and harassment—there's either pending legislation or ongoing litigation, whose outcome will have a dramatic effect on how our complex existing laws will apply online.

Still, in the midst of all this turmoil and uncertainty, some things are clear:

"Choose your words carefully online," says Mark Voorhees, publisher of Information Law Alert, an online newsletter. Is it clear you're stating an opinion and not stating it as if it were fact?

>You are just as liable for what you say and do online as you are offline. And the ramifications of your online actions can actually be more extensive. A posting may be directed to a few people, but thousands can read it.

>A "harmless" copying of a magazine article online can become a serious case of copyright infringement.

>Because commercial online services—unlike the Internet—are private, they can legally censor messages you post online.

To cut through the legalese and put the changing legal views on libel, freedom of speech, copyright, and harassment into perspective, here are some stories that shed light on the murky realm of what you can and can't do and what rights and protections you have in the online frontier.

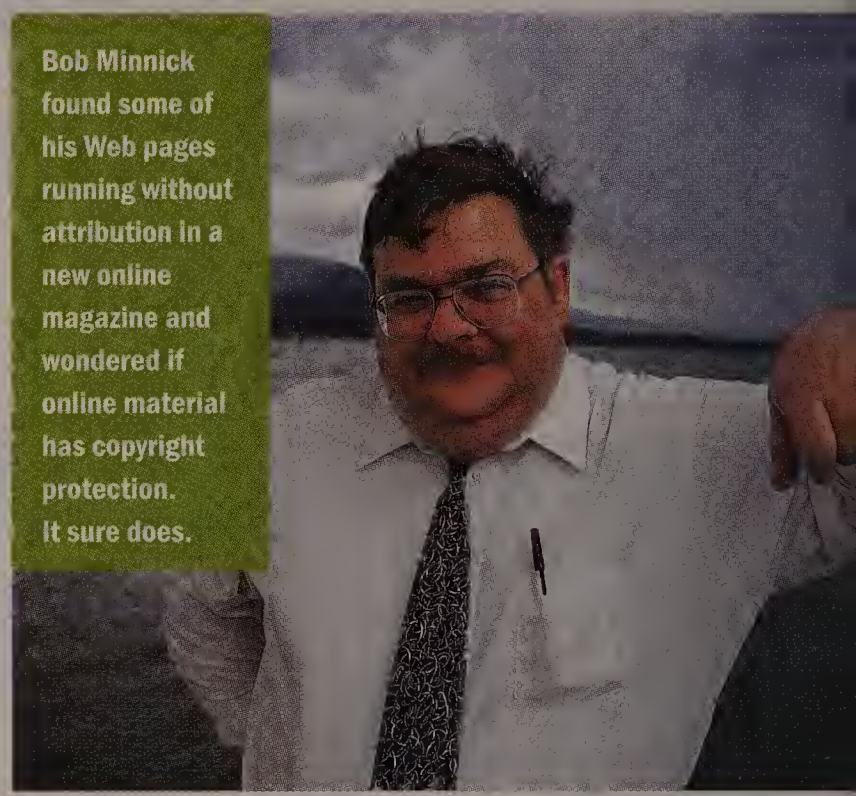
LIBEL

Watch Your Words, Not Your Opinions

You're in the PC customer service area on CompuServe and let off a little steam about a certain computer company that seems completely uninterested in helping you with your problems. It wasn't until after you'd called the staff incompetent and urged a boycott of all the company's products that you wondered if you should have tempered your comments. Should you worry about being sued?

Probably not, but inciting others to boycott a company's products is not the most judicious action. As the U.S. Supreme Court has come to define it, libel requires the presence of these three conditions:

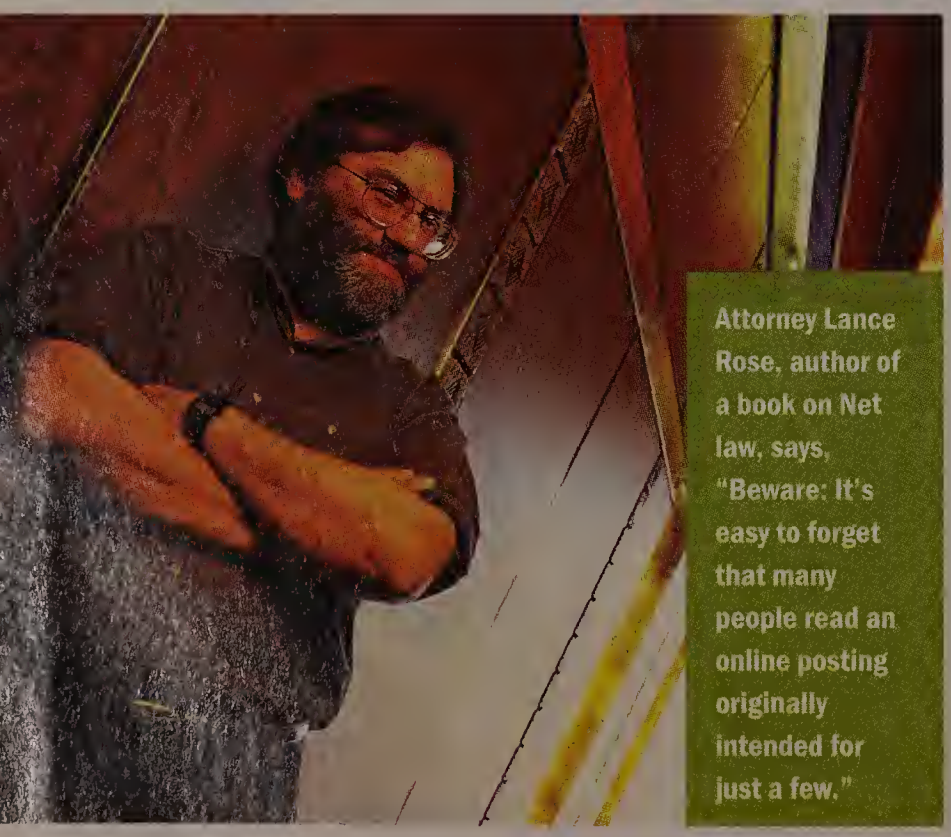
1. The material is defamatory either directly or indirectly;
2. the questionable defamatory statement is about someone identifiable to one or more persons;
3. the material is distributed to someone other than the offended party.



Bob Minnick found some of his Web pages running without attribution in a new online magazine and wondered if online material has copyright protection. It sure does.

Courts award libel damages when a company or an individual has suffered financial harm as a result of something you said. For now, at least, the rules of libel are the same online as they are in any other medium. If what you say is true, it's not libel; if it's opinion, it's not libel.

The big difference in the online world is that while conversations may *seem* personal, they aren't. "There's a high lurker-to-participant ratio online," says attorney Lance Rose, author of *NetLaw: Your Rights in the Online World* (Osborne/McGraw-Hill, 1995, 800/227-0900). "For every person talking, there are probably ten people watching." And unlike a passing comment you make by the office watercooler, online postings can linger for a long time and be read by hundreds of thousands of people.



Attorney Lance Rose, author of a book on Net law, says, "Beware: It's easy to forget that many people read an online posting originally intended for just a few."

One of the most widely discussed online libel cases concerned the investment banking firm Stratton Oakmont, which sued Prodigy over a posting by one of its users accusing officers of the firm of criminal activity. (The originator of the message has never been identified, because they used a subscriber's account without that individual's knowledge.) The New York Supreme Court ruled that Prodigy *was* liable for the posting on its message area.

That's because up to that time, the service had heavily publicized its practice of monitoring message areas and as a result had put itself in the position of an information publisher, not merely an information carrier. Although a provision of the Communications Decency Act of 1996 seeks to reverse the decision, for now online services can be held accountable for the postings of their members if they monitor those postings for content and remove offending items.

Don't assume, though, that you're off the hook: Individuals too can be sued for libel. "Anyone who posts actively online should be aware of the laws, just as someone driving needs to know the rules of the road," says Mark Voorhees, publisher of the online newsletter *Information Law Alert*. His advice: Think about the ramifications of the post and choose your words carefully. Is it clear you're stating an opinion? Does the person you're talking about have an opportunity to respond? You're on safer ground, for example, if your comments concern someone who's a regular to the forum or newsgroup in which you post your message, since they'll have an equal opportunity to respond in a timely fashion.

Moral: You cannot be held liable for telling the truth. But if you state a mistruth as if it were a fact, you could be liable for libel. If you state a mistruth as an opinion, you're off the hook—you have a right to say what you *think*.

FREEDOM OF SPEECH

Big Brother May Be Reading You

I composed an articulate, well-thought-out message and proceeded to post it on my favorite online forum. The next day I logged on to find a message indicating that the forum leader had bounced back my posting because the message was considered in bad taste. What about freedom of speech? They can't censor my message, can they?

They sure can. The First Amendment stipulates only that the government is not permitted to censor speech; private companies can. That means online services can delete any postings they consider to be a violation of their bylaws or offensive to their members. This censorship happens fairly regularly, says Lynne Bundesen, who runs the religion forum and all related message boards on the Microsoft Network and ran religion and adoption forums on Prodigy.

So what do you do if a message gets removed or edited? First, send a note to the forum leader asking for an explanation. If he or she doesn't give you a satisfactory response, appeal the decision to the management of the online service. The bottom line, though: When you're using an online service, it calls the shots about what can be said.

Moral: Freedom of speech can legally be more limited online. Be aware of where you say what you say. Commercial online services and Web sites run by private companies are within their rights to delete postings they deem offensive.

COPYRIGHT

You Create It, You Own It

Bob Minnick spent 300 hours creating and refining Beginner's Central, a series of how-to Web pages for cyberspace newcomers. Then one day he discovered entire portions of his work running in a new online magazine without any attribution. "I started reading and said, 'Wait. This is what I did,' " recalls Minnick. "I went from shock to outrage." Unsure about what to do next, Minnick posted a question on http://infolawalert.com, a Web page hosted by Information Law Alert's *Mark Voorhees, asking: "Is my home page protected under copyright law?"*

You bet it is. All original work, whether or not it bears the copyright symbol or some other explicit statement of ownership, is protected by copyright law. That means you can't use somebody else's work as your own or distribute it without permission from the author or owner of the copyright (often the publisher). "Cyberspace feels like such a public place that people assume everything is free," says attorney Rose. "It's one of the biggest myths about the online world."

Certain limited uses are allowed under the "fair use" provision of U.S. copyright law. For example: If you're copying only a small portion of a document (say, one or two paragraphs of an article) and citing the original source, then you're okay. It's also considered legally acceptable to copy a document you find online to your hard drive for *personal* use. But when you post that file to a mailing list or on a public forum or company-wide, or when you modify HTML files and then call the documents your own, you've just infringed on someone's copyright.

Minnick discovered, for example, that the offending e-zine publisher had taken his files from a Usenet posting, which hadn't credited the original source. "I tried to track it down, but by that time the original message had expired and the publisher had not bothered to keep the original copy," says Minnick. Fortunately, once the publisher was notified of the problem, he quickly issued an apology and withdrew the issue from circulation.

With the help of powerful search engines like Alta Vista and Infoseek, large publishers are hunting down unauthorized uses of their

How to Stay out of Trouble Online

There *are* laws in cyberspace, even if they are still developing and sometimes ambiguous. To play it safe, just assume that the same laws apply online as anywhere else. Here are some tips to keep you out of trouble.

1 Do not use somebody else's work on your Web page or in your e-mail without their permission.

This admonition applies equally whether the work is written text, program code, clip art, or anything else that is copyrighted. The "fair use" provision allows you to copy and distribute copyrighted material without permission, depending on the purpose (a school can copy more text than a business), the amount of the original used (copying only a small part of the original helps), and the effect of the use on the potential market for the original. When in doubt, contact the author and get permission to use the material. Finally, always acknowledge the author's copyright when you copy material.

2 Be careful about making statements that can harm a person's or company's reputation.

You are as responsible for your false or misleading words online as you are elsewhere. Disparaging lies published in an online forum or Internet newsgroup can get you sued just as they can in the print media. Truth, however, is the best defense to a libel action.

3 Do not post adult-oriented materials on the Internet or on any online service.

The recently enacted Communications Decency Act makes the posting of explicit sexual materials illegal in some circumstances, but this law is rife with ambiguities and constitutionally questionable provisions. Test cases before the Supreme Court will eventually provide many answers. Until then, don't make yourself a test case.

4 Assume that online agreements are enforceable.

That includes buying goods in a cybermall, a business deal arranged by e-mail, or any other type of agreement. Since the law regarding online contracts is still developing, you may have ways to escape an agreement formed online, but don't depend on it.

5 Use digital signatures in your business if you are arranging substantial deals online.

Digital signatures, with their unique coding, can reliably authenticate the sender of an e-mail. Remember, although some types of contracts are enforceable without a signature, many are not. The American Bar Association offers a Web page with information on digital signatures (http://www.Intermarket.com/ecl/digsgleg.html).

—Mark Grossman

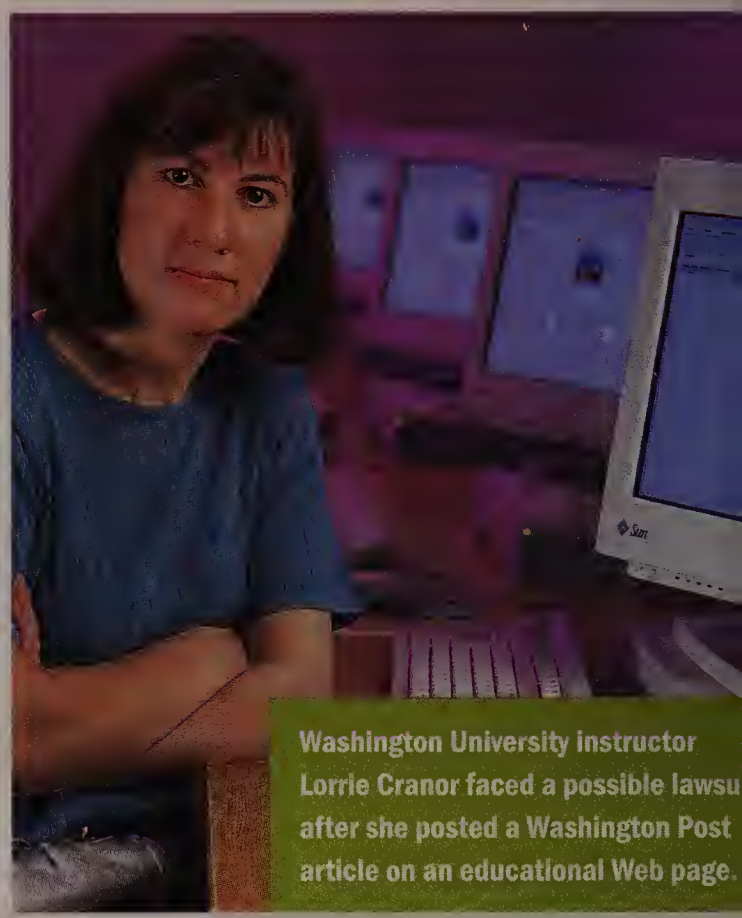
material. Last April, for example, Washington University instructor Lorrie Cranor received a "cease and desist" letter from an attorney for the *Washington Post*. Her offense? Three years ago Cranor posted a *Post* article on a Web page that serves as a reference for her students. The page includes hundreds of articles and pointers to other locations. Although Cranor is covered under the fair use provision of copyright law (which allows for such educational use), she decided not to fight. "We didn't want to become a test case. The article wasn't that great anyway," says Cranor.

Moral: You create it—you own it. They create it—they own it. Current copyright laws apply online as well.

HARASSMENT

Old Flames Die Hard

Kimberly W. was cruising the Looking for Love section of America Online and got into a steamy chat with another subscriber. Chad F. said he wanted to meet again the next night, but Kimberly declined, saying she didn't want to rush into anything. But soon she was receiving harassing e-mail, and Chad was following her to different chat and message areas. Kimberly was ready to cancel her subscription but then wondered if there was a way she could go after the scorned Don Juan for harassment.



Washington University instructor Lorrie Cranor faced a possible lawsu after she posted a Washington Post article on an educational Web page.

In the online world, just as in our everyday world, documentation is the first line of defense against harassment, says David Phillips, associate general counsel for AOL. So keep copies of all offensive e-mail messages and of offending posts in message areas or newsgroups. If you're being harassed by a subscriber of a commercial service, such as AOL, Prodigy, or CompuServe, contact the service's management.

"Our terms of service explicitly prohibit unwanted attempts to cause embarrassment," says Phillips, noting that the offender will first receive a warning and then, if the problem persists, will be kicked off the service. If you're being harassed in a chat area, you can send an instant e-mail message to the administrative staff and have the offender caught in the act, so to speak. The online service's terms of service expressly forbid harassment of members.

But what if the harassment is coming from someone who's posting messages or sending e-mail straight over the Internet? "Complain to the local authorities," says attorney Rose, noting that many state and local jurisdictions are becoming aware of the issue. Local authorities are your first line of defense: They will refer your case to federal authorities when applicable.

Connecticut enacted a law last year making it a crime to harass another individual online. On the federal level, a provision of the Communications Decency Act makes online harassment—the purposeful threatening, embarrassing, or causing distress of another person—a criminal offense punishable by a fine and up to two years in prison.

None of the laws against online harassment have been tested in court, so be prepared for some challenges should you decide to pursue a case. "These issues aren't all that straightforward," says AOL's Phillips. "One person's harassment might be another's freedom of speech."

Moral: You can defend yourself more easily online than off. Reporting the harassment to online service management and changing your online account or name are first-line countermeasures.

Roberta Furger is senior writer for PC World. *Mark Grossman is an attorney specializing in the business law of computer technology in Miami, Florida.*

Legal Resources Online

Not surprisingly, the Internet is full of legal resources and groups that track legal issues closely. Here's just a sampling of what's available.

American Civil Liberties Union

Check out the Cyberliberties section on the home page of this country's foremost civil liberties group. It includes up-to-date information on a range of issues, including ongoing legislation and precedent-setting court cases (http://www.aclu.org/index.html).

Center for Democracy and Technology

Look to this page for thoughtful position papers on a variety of civil liberties issues, plus an excellent day-by-day report of ongoing legal challenges to the Communications Decency Act (http://www.cdt.org/).

Copyright Clearance Center Online

This is a great source for help in protecting your copyright material or making sure you're complying with copyright laws (http://www.openmarket.com/copyright).

Electronic Frontier Foundation

The site includes information on everything from encryption and privacy to the ongoing legal wrangling over the Communications Decency Act. There are also many links to other related organizations (http://www.eff.org).

Information Law Alert

The home page for this online newsletter includes an informative question-and-answer section (http://infolawalert.com).

Interactive Services Association

This trade association recently initiated a campaign to educate consumers on four critical online issues: copyright, consumer protection, privacy, and parental empowerment (http://www.isa.net).

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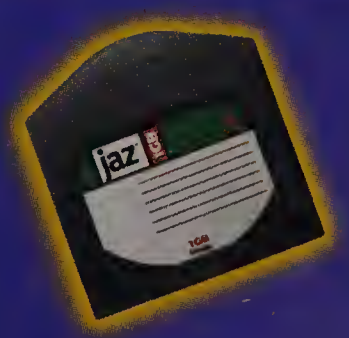

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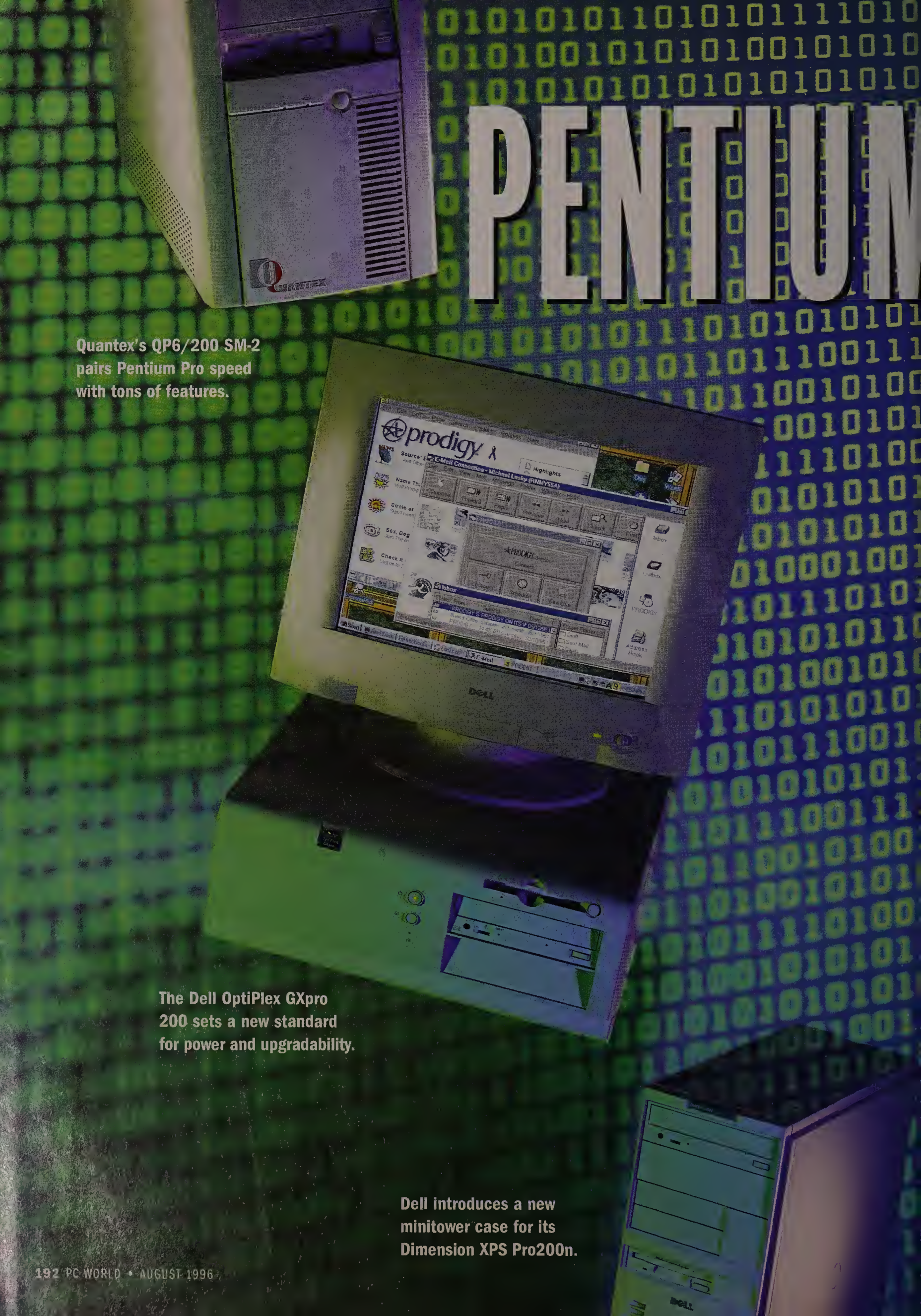

Quantex's QP6/200 SM-2 pairs Pentium Pro speed with tons of features.

The Dell OptiPlex GXpro 200 sets a new standard for power and upgradability.

Dell introduces a new minitower case for its Dimension XPS Pro200n.

PCs Go Pro

Pentium Pro-200 PCs set a new standard for Windows 95 computing, with Dell's OptiPlex GXpro 200 leading the way. By Brad Grimes

THE TOP 20 PC WORLD
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Budget pg. 204
Notebooks pg. 212

Yes, Virginia, you *can* buy a Pentium Pro PC with Windows 95. Sure, Intel's high-end CPU has been touted as a Windows NT processor, but times have changed. If the fastest Pentium-166 PCs today don't impress you, your best choice is to go with the Pro—it's not just for NT workstations anymore.

So what's the difference between a Pentium Pro and a Pentium? Funny you should ask, because Intel faced that same question when it released the Pentium Pro last fall. Besides physical differences—Pros have built-in secondary cache and can execute instructions in parallel—what distinguished early Pentium Pros from their successful Pentium counterparts was their strength at running 32-bit software. Early tests showed that 150-MHz Pentium Pros ran 16-bit programs slower than existing Pentiums did. On the other hand, they excelled when running 32-bit programs (see *Top of the News*, December 1995). Therefore, it made sense for computer vendors to sell Pentium Pro systems with Windows NT—a 32-bit OS—rather than with Windows 95, which still has 16-bit code. But now vendors like Dell, Gateway 2000, IBM, Quantex, and Xi are selling Pentium Pro systems with Windows 95 as well as with NT. The reason? With Pentium Pros now running at 200 MHz and more 32-bit Windows 95 applications on the market, a Pentium Pro-200 is the fastest Windows 95 system you can buy.

Picking Your Pros

If you run Windows 95 and want the extra power of a Pentium Pro, skip the 150-MHz version of the CPU. Our tests show that Pentium Pro-150 systems perform only as well as fast P-166s, yet they cost $200 more.

On the other hand, today's 200-MHz Pentium Pro PCs really fly—about 14 percent faster than the average Pentium-166. That's a significant performance boost when you consider that the average P-166 is 12 percent faster than the average P-133. The latest Pentium Pro-200 PCs are also faster than the first regular Pentium-200 PCs we've tested (see *Top of the News*, July).

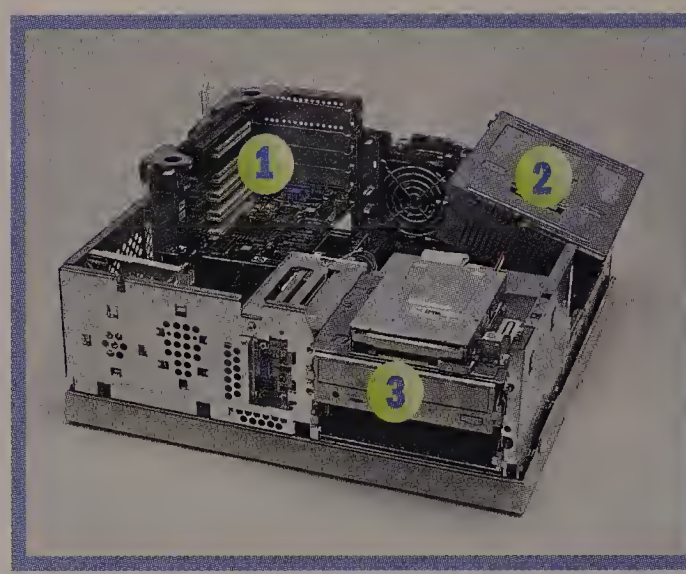
To some extent the high performance of Pro systems is due to the chip's design. With secondary cache built into the chip, data is accessed at the speed of the CPU's clock, in this case 200 MHz, rather than at the rate of the system bus—either 60 or 66 Hz. Another big contributor to the speed of Pro systems is their 32MB of RAM, standard on most Pentium Pro-200s. Fortunately, with memory prices falling, the extra RAM hardly affects system price. Dell's Pentium Pro-200 Dimension with 32MB and a 2.1GB hard drive goes for $3599, while the new Pentium-200 Dimension with 16MB and a 2.5GB hard drive costs $3429.

This month four Pentium Pro-200 systems crack the Power chart for the first time; three of them were tested for this issue. The top-ranked $4676 Dell OptiPlex GXpro 200 and the number 3 $3599 Dimension XPS Pro200n earn Best Buys, while the $3549 Quantex QP6/200 SM-2 lands at number 11. All three systems come with 32MB of RAM and huge 2GB-plus hard drives. Although their prices are high, these systems cost no more on average than P-166 PCs did when they first appeared, and the Pentium Pro-200s come with more hardware. The fourth Pro-200 on the chart is the $5299 Xi Pro 200-MTower SP, which we reviewed in July. Xi's Pentium Pro-200 is in 16th place. With PC WorldBench scores ranging from 211 to 232, these four systems are the fastest PCs we've tested.

Three other new entries on the Power chart are based on the P-166 processor. Dell's $3877 OptiPlex GXMT 5166 and NEC's $3257 PowerMate P166 are updated versions of systems reviewed previously. Both feature fast graphics cards with 4MB of memory and designs that suit them to corporate buyers. The $2949 Quantex QP5/166 SM-2 is perfect for home or office. It not only is the fastest P-166 we've tested, but it also comes with lots of extras.

Dell's $1849 Dimension P100t remains atop the Budget Desktops chart this month on the strength of its low price and sturdy design. New Budget Top 20 PCs include the 2nd-ranked $2223 Dell OptiPlex GXM 5100, an affordable corporate PC with built-in networking hardware, and the 20th-place $2448 NEC Ready 9617, a loaded home PC that suffers from slow performance.

The most significant budget desktop not to make the chart is the $2330 AST Bravo LC 5166, a P-166. It's the first PC we've seen that uses universal memory architecture, where part of the system's main RAM acts as the graphics frame buffer. Skeptics of UMA feared it would hurt performance, and so far they appear to be correct. The Bravo's PC WorldBench score of 160 is more like that of a sluggish P-100.



Dell's new OptiPlex desktop design is a study in upgradability. After easily slipping off the case, you find (1) a riser plane for add-in boards that pops out at the touch of a button to make installing cards a snap; (2) a power supply that swings out of the way to give you unobstructed access to the motherboard; and (3) a pair of externally accessible drive bays as easy to upgrade as any we've seen.

Traveling at 133 MHz

The latest power notebooks continue to break speed records. This month two P-133 portables, Dell's $5099 Latitude XPi P133ST and Micron's $4998 Millennia Transport, top 160 in our PC WorldBench test suite—the highest notebook scores we've ever recorded. The Latitude, with its 11.3-inch super-VGA display and 5.3-hour battery life, earns our top Best Buy, while the Transport, with a 4X CD-ROM drive and a cellular modem, lands at number six.

Toshiba continues its domination of the budget notebooks chart. The Satellite 100CS, T2130CS, and T2130CT hold the top three spots by delivering reliable performance at reasonable prices. New this month is the $1799 NEC Versa 550D, a sleek, comfortable notebook with a pleasing dual-scan screen.

Brad Grimes is an associate editor for PC World. *He can be reached on PC World Online (see page 14 for contact information). Associate editor Melissa Riofrio, assistant editor Eric Hellweg, and freelance writers Joe Hutsko and Jon L. Jacobi contributed to this article. Testing by Ulrike Diehlmann and Mike Salayko; research and support by Ann Cassidy, Andrew Hawn, and Julian Weatherby.*

For more information about all products in this article, circle reader service no. 906.

Alphabet Soup or PC Technologies?

At first glance, these letters look like alphabet soup, but they spell the future of personal computers.

AGP (accelerated graphics port) A special interface to speed up graphics-intensive applications like 3-D software. The AGP interface will let graphics cards access a PC's main memory directly to accelerate 3-D functions such as Z-buffering. Systems with AGP will be out next year.

DVD (digital video disc) A storage format that can pack about 4.5GB of data on a disc that looks like one of today's CDs. That's over 7 times the capacity of current CD-ROMs. DVD drives will work like today's CD-ROM drives and be able to read the old CD format. They should be popping up by the end of 1996 for around $350.

MMX (multimedia extensions) A set of new instructions that Intel is adding to its Pentium CPUs. These instructions speed up functions like video playback, videoconferencing, and more. High-speed Pentiums, such as the P-200, will incorporate MMX first, reportedly in late 1996. Other chips will get the MMX boost in 1997.

SDRAM (synchronous dynamic random access memory) The next step in PC memory. It's faster than the currently popular EDO (extended data out) DRAM, but for now it's also more expensive. Vendors like Dell and Gateway 2000 have adopted SDRAM in their newest high-end Pentium PCs, which we will review soon.

USB (universal serial bus) When PCs start incorporating USB, you'll be able to connect multiple peripherals—as many as 126—to your system through one port. Data transfer rates will also improve. Intel will ship motherboards with USB by the end of the year.

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76i/76m†	17" FST (15.7" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56i	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI
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THE TOP 20

PC WORLD

POWER DESKTOPS

1 **Dell OptiPlex GXpro 200**
Blazing speed, great design.

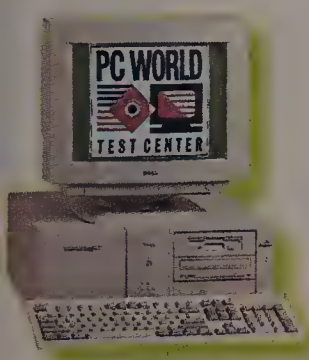
		Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Dell OptiPlex GXpro 200	–	1	current	94	232	77/77	$4676	Pentium Pro-200	32	2140
2	Dell Dimension XPS P133c	1	10	July 96	93	192	77/77	$3079	Pentium-133	16	1080
3	Dell Dimension XPS Pro200n	–	1	current	92	211	77/77	$3599	Pentium Pro-200	32	2140
4	Dell OptiPlex GXMT 5166	–	1	current	91	197	77/77	$3877	Pentium-166	16	1624
5	Micron P133 Millennia	3	13	Mar 96	89	182	76/69	$2649	Pentium-133	16	1624
6	HP Vectra 500 Model 515MCx 5/166	4	2	July 96	88	192	78/66 [3]	$3345	Pentium-166	16	1624
7	Micron P166 Millennia Plus	5	7	Mar 96	87	198	76/69	$4148	Pentium-166	16	2150
8	Maximus Magna Media P-166	6	2	July 96	84	201	[3]	$2499	Pentium-166	16	2140
9	Quantex QP5/166 SM-2	–	1	current	84	209	63/65	$2949	Pentium-166	32	2560
10	Gateway 2000 P5-133 Family PC	12	3	June 96	84	172	68/69	$2709	Pentium-133	16	1624
11	Quantex QP6/200 SM-2	–	1	current	83	224	63/65	$3549	Pentium Pro-200	32	2560
12	HP Vectra VL Series 4 5/166 MT	7	4	May 96	83	197	78/67 [3]	$3915	Pentium-166	16	1624
13	NEC PowerMate P166	–	1	current	82	194	70/68 [3]	$3257	Pentium-166	16	2140
14	Xi P166MTower SP	9	2	Apr 96	82	199	[3]	$2999	Pentium-166	16	1280
15	Compaq Deskpro XL 5133	10	6	Mar 96	82	173	76/71	$4099	Pentium-133	16	1080
16	Xi Pro 200MTower SP	–	1	July 96	81	221	[3]	$5299	Pentium Pro-200	32	4300
17	Compaq Deskpro 5133	14	4	Mar 96	80	161	76/71	$3599	Pentium-133	16	1080
18	Compaq ProLinea 5100	–	4	Mar 96	80	161	76/71	$2798	Pentium-100	16	1080
19	Cyrix 6x86-P166+ PC	15	2	July 96	80	199	[3]	$4639	Cx6x86-P166+	16	4000
20	Polywell Poly 5166P8	18	3	May 96	80	201	[3]	$2550	Pentium-166	16	1080

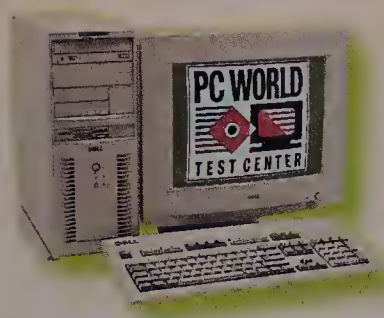
BEST BUY

[1] Percent contribution to overall rating: PC WorldBench score (25); reliability (25); features (20); price (15); service and support (15).

[2] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktop, Budget Desktop, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available July 31). You can also order a previous month's Top 20 chart with capsule reviews plus Features Comparison and Test Report ($4.50) and individual capsule reviews with Features Comparison and Test Report ($1.50 each). Prices effective for the

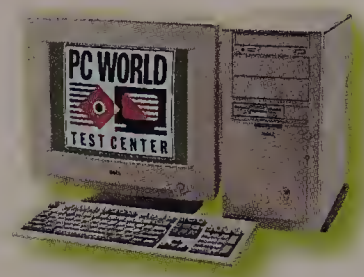
2 **Dell Dimension XPS P133c**
Old favorite is still a Best Buy.





3 **Dell Dimension XPS Pro200n**
New case enhances overall package.

4 **Dell OptiPlex GXMT 5166**
PC power and built-in networking.



5 **Micron P133 Millennia**
Solid PC from reputable vendor.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number[2]	Reader service no.	Comments (Recommended as home system)
4X	ISA, PCI	17"/.28	800/613-3355	3401	654	Fastest system to date, brilliant new design, built-in networking, high reliability rating.
6X	ISA, PCI	17"/.28	800/613-3355	3299	655	$220 price drop; comes with Imagine128 graphics card, 28.8-kbps fax-modem.
8X	ISA, PCI	17"/.28	800/613-3355	3402	656	New case design is a plus, but system is slow for a Pentium Pro-200.
4X	ISA, PCI	17"/.28	800/613-3355	3403	657	Not the fastest P-166 but well built, with a hot graphics card and integrated ethernet.
8X	ISA, PCI	15"/.28	800/223-6571	3268	658	Quality PC, new 8X CD-ROM drive; P-100, P-120, P-150, and P-166 flavors also good values.
4X	ISA, PCI	15"/.28	800/752-0900	3383	659	HP's new line is good for small and home offices; nice design includes voice mail.
8X	ISA, PCI	15"/.28	800/223-6571	3331	660	SCSI version of reputable Millennia priced with Iomega Jaz drive and new 8X CD-ROM drive.
6X	ISA, PCI	15"/.28	800/888-6294	3384	661	Super price for loaded P-166 with lots of expansion room; also makes it on Budget chart.
8X	ISA, PCI	17"/.26	800/896-4898	3404	662	Superb deal; the extra memory costs only $100 more; Quantex has boosted support hours.
8X	ISA, PCI	17"/.26	800/846-2000	3373	663	Formerly marketed as P5-133XL, loaded PC has new 8X CD-ROM drive, costs $260 less.
6X	ISA, PCI	17"/.26	800/896-4898	3405	664	Better performance and more features than Dimension Pro-200, but reliability score hurts.
4X	ISA, PCI	15"/.28	800/752-0900	3362	665	Well-designed PC aimed at large corporations; P-133 version is also a good choice.
6X	ISA, PCI	15"/.28	800/632-4636	3406	666	Best of NEC's PowerMate line; quality components but so-so P-166 performance.
6X	ISA, PCI	17"/.26	800/432-0486	3385	667	$200 price drop, nice monitor, 28.8-kbps fax-modem; company's reliability is unknown.
4X	EISA, PCI	15"/.28	800/345-1518	3340	668	Solid machine, but you pay a premium for built-in SCSI, networking, and EISA expansion slots.
6X	ISA, PCI	17"/.25	800/432-0486	3407	669	$400 price drop lands fast, loaded Pentium Pro-200 on chart; company's reliability unknown.
4X	ISA, PCI	17"/.28	800/345-1518	3344	670	Mainstream version of network-oriented sibling; well built, but awfully pricey for a P-133.
—	ISA, PCI	17"/.28	800/345-1518	3408	671	Superior personal or office machine, but you pay a lot for what you get; no CD-ROM drive.
6X	ISA, PCI	17"/.27	800/340-7501	3387	672	First PC from chip maker is fast and loaded, but expansion is limited.
4X	ISA, PCI	15"/.28	800/999-1278	3372	673	Lots of processing speed for the money; not enough data to rate reliability and service.

U.S. and Canada. Foreign orders are $15 for advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews.
[3] Fewer than 100 Reliability and Service Monitor responses. Rating is based on responses for this company and the average of responses for all companies. No score is shown if we received fewer than 20 reliability or service responses.

For more information about all products in this table, circle reader service no. 907.

Top 20 Power Desktops

In spite of its daunting price, the $4676 Dell OptiPlex GXpro 200 debuts at number one on the strength of its scorching performance and unique modular design. Close on its heels are the new $3599 Dell Dimension XPS Pro200n and $3549 Quantex QP6/200 SM-2. All three of these newcomers are Pentium Pro-200s. The fourth Pro-200 on the chart—the $5299 Xi Pro 200MTower SP—was reviewed in July. It comes with a huge 4.3GB hard drive and a crisp Trinitron monitor.

Note the name change for the tenth-place Gateway 2000 Pentium-133. Previously called the P5-133XL, this model is now sold as the P5-133 Family PC, with a software bundle that includes Microsoft Works, Publisher, Encarta, and more. The system also comes with an 8X CD-ROM drive, sound, speakers, and a 28.8-kbps fax-modem.

1 Dell OptiPlex GXpro 200

NEW THIS MONTH

PROS: Fastest system we've tested, exceptional design, integrated networking

CONS: Expensive

If you're the kind of person who wants the fastest PC on the block, the Dell OptiPlex GXpro 200 is for you. Based on the Pentium Pro-200 (not to be confused with Intel's new Pentium-200), this is the fastest computer we've had on the test bench—over 10 percent faster than the speediest Pentium-166 system we've tested.

Dell OptiPlex GXpro 200

But if you're seriously considering the OptiPlex GXpro 200, it might be a good idea if your thirst for power were matched by a practical need for connectivity. After all, part of the system's high $4676 price covers the built-in networking hardware: an integrated 3Com ethernet 10Base-T adapter.

Several high-end components contribute to the system's price and power, including 32MB of RAM and a 2.1GB Enhanced-IDE hard drive. There's also a Number Nine Imagine 128 Series 2 video card with 4MB of VRAM. This exceptional board has a 128-bit data path for peak performance even at high resolutions and color depths. What's more, it accelerates 3-D functions.

This system's other components are more ordinary. It comes with a 4X CD-ROM drive, an integrated Vibra sound chip, and Altec Lansing ACS 31 speakers.

The GXpro introduces a major redesign to the OptiPlex case, vastly improved from previous Dell systems. We were particularly impressed by the modular architecture. The case snaps open easily without tools. Cards are housed on a vertical riser plane that pops out at the touch of a lever. Even the power supply swings aside for easy access to the motherboard and drive bays. As we'd expect from Dell, the system manual explains the new design clearly.

Part of Dell's comprehensive support for the OptiPlex line includes guaranteed on-site service the next business day. The company continues to top our ongoing reader fax-back survey in the category of service satisfaction.

2 Dell Dimension XPS P133c

LAST REVIEWED: July 1996

PROS: Fast, great graphics card, easy to upgrade, reliable, good service

CONS: High-end components add to price

A $220 price drop to $3079 adds to the lure of this fast, well-built Pentium-133. If you can do without the high-end Number Nine Imagine 128 graphics card, you can lop another $330 off the price and still get great performance. We also like the $3049 Dimension XPS P120c and the $2999 XPS P100c, both of which we tested in the same configuration. Dell has phased out the P-166 version of this system in favor of a new design, which we will review soon. Eventually Dell will also replace the P-133 version. For now, though, the XPS P133c remains a Best Buy.

3 Dell Dimension XPS Pro200n

NEW THIS MONTH

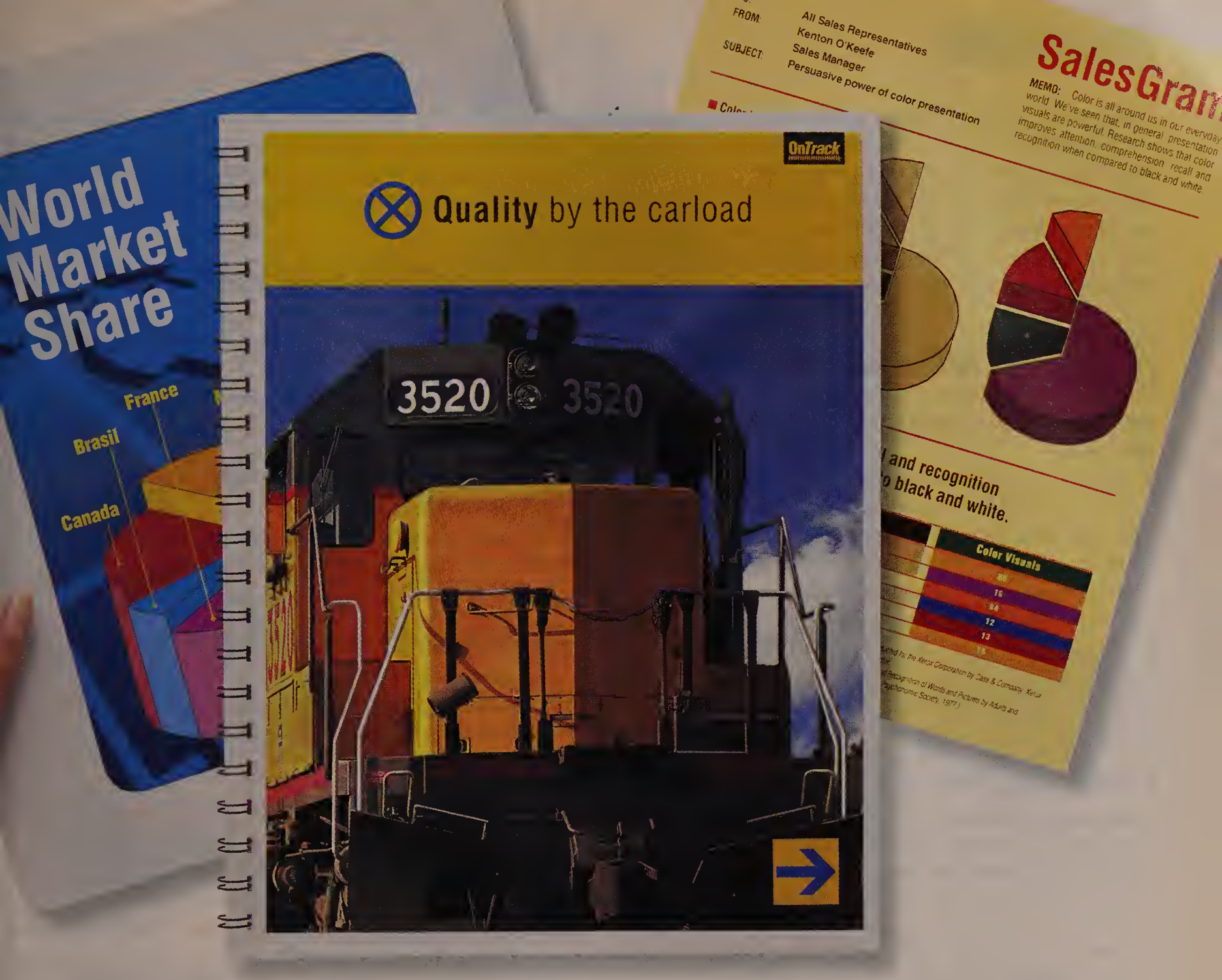
PROS: Improved case design, tidy interior, big hard drive, powerful graphics card

CONS: Sluggish performance for a Pentium Pro-200

What's the most notable feature of the Dimension XPS Pro200n? The all-new minitower case. This new design replaces the horizontal on/off button, which was easy to mistake for the floppy eject, with a large round button placed square in the middle of the front panel. Inside the case, the power supply, drive bays, and motherboard are all arranged perfectly to eliminate cable clutter and allow for easy upgrading.

Performance is a disappointment in this instance. The system's faster than a typical P-166, but its PC WorldBench score of 211 is low for a Pentium Pro-200. During testing we had trouble loading some of our test apps. Dell traced the problem back to the graphics drivers for the Imagine 128 Series 2 card that came in our test unit. We've seen the same card perform well in other PCs, which leads us to believe Dell may be able to boost the XPS Pro200n's performance with the proper drivers.

Dell Dimension Pro200n



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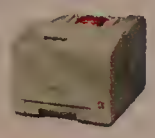
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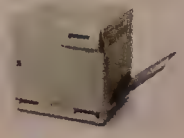
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At $3599, the XPS Pro200n is a good deal. It comes standard with 32MB of RAM, a 2.1GB Enhanced-IDE hard drive, and an 8X CD-ROM drive. For comparison's sake, when Dell shipped us its first Pentium-166 Dimension with 32MB of RAM in March, the price was almost $1000 higher. Dell now builds a three-year warranty into the price of all Dimensions. Customers who want to save $199 can request a one-year warranty.

4 Dell OptiPlex GXMT 5166

NEW THIS MONTH

PROS: Good performance, built-in ethernet, clean interior, great service and support

CONS: Expensive

This $3877 Pentium-166 OptiPlex model is a revised version of the high-end GXMT 5166 we reviewed in May. This time Dell included only 16MB of RAM rather than the earlier version's 32MB, but it doubled the secondary cache to 512K and included a more potent video card—Number Nine's Imagine 128 with 4MB of VRAM. The result is a solid performer among P-166 systems with 16MB of RAM, though not as quick as the earlier version.

Dell OptiPlex GXMT 5166

Like all OptiPlex models, the GXMT 5166 is for corporate settings. Ethernet is built in, all ports and interfaces are built into the motherboard, and the interior is impeccably clean. It's not the same modular design as the top-ranked GXpro 200 but still easy to navigate.

You get a 1.6GB hard drive, a 17-inch monitor, integrated 16-bit sound, and a pair of Altec Lansing speakers. There's no modem, though, and the CD-ROM drive remains a 4X model.

Dell's top-notch service and support plan includes a three-year warranty and round-the-clock toll-free phone support. Though this system is far from the cheapest Pentium-166 on the chart, its good performance, fastidious design, and strong support make it a winner for office environments.

Last month, the P-133 version of this system cost $3355 and was our top-rated OptiPlex. This month, that system costs only $2813—nearly $550 cheaper—and it's still an excellent choice, although 7 percent slower than the P-166.

5 Micron P133 Millennia

LAST REVIEWED: March 1996

PROS: Speedy, loaded with features, full multimedia

CONS: Reports of DOA components have increased recently

At $2649 the P133 Millennia is one of the best bargains on the Power chart. It's loaded with memory, secondary cache, and hard disk space, and it comes with an 8X CD-ROM drive. The low price is due partly to the standard 15-inch monitor. Micron sells this PC with a Hitachi SuperScan 17-inch monitor for $300 more.

All the other Millennias we've tested are good values, too, like the $3048 P166 Millennia (reviewed in April) or the $2848 P150 Millennia (reviewed in May). Two other Micron PCs, the P120 Millennia and the P100 Millennia, now cost under $2450; the former ranks high on the Budget chart. Micron's scores for system reliability and service are down recently in our fax-back survey—readers report more DOA components and overall problems.

6 HP Vectra 500 Model 515MCx 5/166

LAST REVIEWED: July 1996

PROS: Reliable; intelligent design; good software bundle; sound; speakers; 4X CD-ROM drive; 28.8-kbps voice fax-modem

CONS: Wimpy graphics subsystem with 1MB DRAM, one-year warranty

7 Micron P166 Millennia Plus

LAST REVIEWED: March 1996

PROS: Good performance, 2.1GB SCSI hard drive, 1GB Jaz removable storage drive

CONS: Expensive ($4148) for a system with a 15-inch monitor

8 Maximus Magna Media P-166

LAST REVIEWED: July 1996

PROS: Inexpensive ($2499); fast; 2.1GB hard drive; sound; speakers; 6X CD-ROM drive

CONS: One-year parts warranty, unknown track record for service and reliability

9 Quantex QP5/166 SM-2

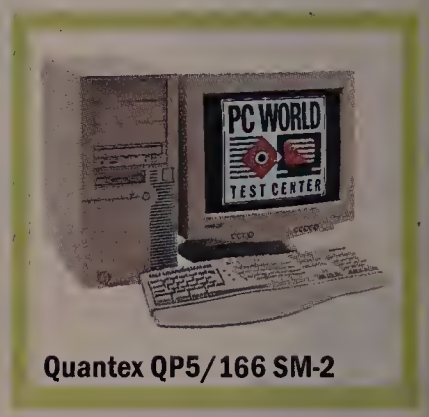
NEW THIS MONTH

PROS: Extremely fast and feature rich, 2.5GB hard drive, good expandability

CONS: Dull monitor, one-year warranty, low service and reliability scores

Quantex's latest chalked up a PC WorldBench score of 209—the highest performance mark of any Pentium-166 we've tested. This $2949 unit came with 32MB of RAM, 512K of secondary cache and a 2.5GB hard drive.

The system's solidly constructed case gives users ample room for additional storage devices and expansion cards. Its graphics adapter—a Number Nine Imagine 128 Series 2 with 4MB of VRAM—is better than the Diamond card that came with the Quantex Pentium Pro PC (ranked 11th this month). Our test system also came with an 8X CD-ROM drive, an Ensoniq Soundscape wavetable card, a 28.8-kbps voice fax-modem, and bundled software, including the PerfectOffice suite and Grolier's Multimedia Encyclopedia. We have mixed feelings about the MAG DX1795 17-inch monitor. Although it yields a clear, focused picture, its colors aren't as bright as those we've seen on some other monitors.



Quantex QP5/166 SM-2

Quantex's standard warranty runs for one year. The company has recently extended its phone support to 15 hours a day Monday through Friday and 9 hours a day on weekends. Quantex tells us it has also beefed up its support staff. Questions of support aside, the QP5/166 SM-2 offers a compelling combination: terrific performance and loads of features at a reasonable price.

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Maximum DPI	✔ 9600	2400
Bit depth	✔ 33-bit[1]	30-bit
Scanning speed (5" x 7" color photo)	✔ 18 sec.	42 sec.
Lamp	✔ Cold cathode - lasts longer	Fluorescent
Tech support	✔ Toll free	No 800 number
Price [2]	✔ $821	$ 912

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HP Scanjet 4c

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[1] 33-bit equivalent with the analog gamma correction. [2] Average street price from sampled advertisements in Computer Shopper May, 1996.

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10 Gateway 2000 P5-133 Family PC

LAST REVIEWED: June 1996

PROS: Full-featured tower; upgraded 8X CD-ROM drive; $260 price drop

CONS: Mediocre reliability score

11 Quantex QP6/200 SM-2

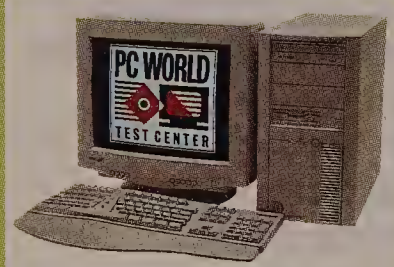
NEW THIS MONTH

PROS: Second-fastest machine we've seen, full featured, great price for a Pentium Pro-200

CONS: One-year warranty, low service and reliability scores, no free SIMM sockets

Quantex's 200-MHz Pentium Pro tower isn't quite as fast as the top-ranked Dell OptiPlex GXpro 200, but its 224 WorldBench score is the second highest ever. And at $3549—more than $1000 less than the OptiPlex—the QP6/200 SM-2 provides a lot of value, including a colossal 2.5GB hard drive and 32MB of EDO RAM.

Surprisingly, this system eschews the Imagine 128 Series 2 graphics board featured in its Pentium-166 counterpart in favor of a Diamond Stealth64 Video—a lesser card, but still no slouch. It's coupled to a 17-inch MAG monitor that's pleasing in most respects but could be brighter. You also get a 28.8-kbps voice fax-modem, a pair of Altec Lansing speakers, an Ensoniq Soundscape wavetable card, a 6X CD-ROM drive, and Microsoft's ergonomic keyboard—a swoopy, split design that takes some getting used to. The bountiful collection of software includes the PerfectOffice suite.



Quantex QP6/200 SM-2

Customers haven't yet had time to evaluate the company's upgraded tech support; for now, readers give Quantex so-so marks for service and reliability in our fax-back survey.

12 HP Vectra VL Series 4 5/166 MT

LAST REVIEWED: May 1996

PROS: Well designed, high-performance Matrox graphics card, three-year warranty standard

CONS: First-class graphics card deserves a 17-inch monitor; no software bundled

13 NEC PowerMate P166

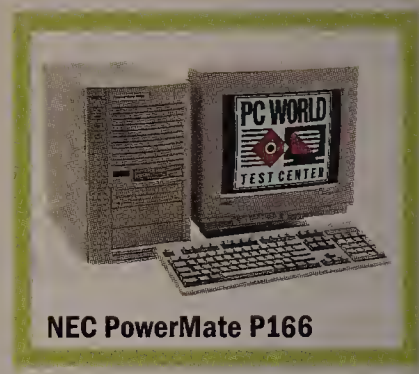
NEW THIS MONTH

PROS:: Generous hard drive; great sound; 6X CD-ROM drive; excellent documentation

CONS: Unremarkable performance for a P-166, SIMM sockets blocked by cables

At first glance, this $3257 PowerMate P166 looks like a perfect no-compromise PC. Its sleek case houses 16MB of RAM, a cavernous 2.1GB hard disk, a Matrox Millennium graphics card with 4MB of WRAM, a 15-inch MultiSync monitor, and a 6X CD-ROM drive. Only sluggish performance and a mediocre service score keep this minitower from top honors. With a PC World Bench score of 194, it lags slightly behind most of the Pentium-166s we've tested.

Still, NEC delivers a lot for your money. Oversize speakers help the stereo sound rival that of NEC's multimedia-oriented Ready 9617 (Budget number 20). It's a simple matter to open the case and reach the expansion slots, although you must negotiate your way through a tangle of cables to add RAM to the SIMM sockets.



NEC PowerMate P166

The NEC PowerMate's thorough on-screen documentation includes step-by-step instructions to help you install expansion cards and use the machine's power-conserving EnergyStar features. The system comes with a three-year warranty for parts and labor, free on-site service for the first year, and toll-free technical support seven days a week around the clock.

14 Xi P166MTower SP

LAST REVIEWED: April 1996

PROS: Good performance, wavetable sound card, 17-inch monitor, 6X CD-ROM drive

CONS: Limited support hours, no feedback from readers regarding reliability and service

15 Compaq Deskpro XL 5133

LAST REVIEWED: March 1996

PROS: High-quality design, network adapter, SCSI hard drive, good reliability and service

CONS: Expensive ($4099)

16 Xi Pro 200MTower SP

LAST REVIEWED: July 1996

PROS: Very fast, full multimedia, 4MB Matrox graphics card

CONS: Pricey ($5299) for use with everyday Windows 95 business apps, noisy cooling mechanism

17 Compaq Deskpro 5133

LAST REVIEWED: March 1996

PROS: Sturdy; well designed; reliable; nice 17-inch monitor

CONS: Expensive ($3599) for what you get, slow for a Pentium-133

18 Compaq ProLinea 5100

LAST REVIEWED: March 1996

PROS: Good 17-inch monitor, plenty of room for expansion, high reliability score

CONS: Expensive ($2798) for what you get, no CD-ROM drive

19 Cyrix 6x86-P166+ PC

LAST REVIEWED: July 1996

PROS: Good performance, huge SCSI hard drive, nice graphics system

CONS: Expensive ($4639), crowded interior

20 Polywell Poly 5166P8

LAST REVIEWED: May 1996

PROS: Fast, inexpensive ($2550), full multimedia, five-year labor warranty

CONS: Limited support hours

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The Smile **CB1716SL...**Hitachi CRT, 0.28 dot pitch, 1280 x 1024 resolution, on-screen digital controls (including tilt and parallelogram adjustments), plug & play capability, MPR-II, dynamic focusing

Circle 206 on reader service card

THE PC WORLD TOP 20

BUDGET DESKTOPS

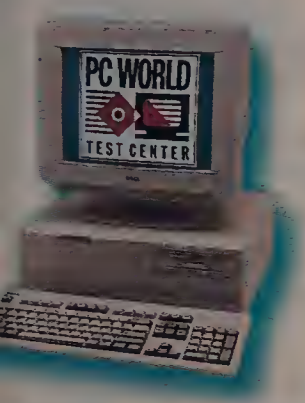
1 **Dell Dimension P100t**
High quality, low price.

	Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension P100t	1	2	July 96	93	173	77/77	$1849	Pentium-100	16	1600
2 Dell OptiPlex GXM 5100	–	1	current	90	170	77/77	$2223	Pentium-100	16	1083
3 Gateway 2000 P5-120	4	7	Mar 96	86	176	68/69	$1979	Pentium-120	16	1624
4 Vektron Multimedia P-100	2	7	Mar 96	86	171	[3]	$1695	Pentium-100	16	2100
5 Quantex QP5/100 M-3	3	5	Apr 96	86	167	63/65	$1849	Pentium-100	16	1600
6 Micron P120 Millennia	–	1	Mar 96	85	171	76/69	$2449	Pentium-120	16	1624
7 Micro Express MicroFlex-686/P120+	–	1	current	85	175	[3]	$1399	Cx6x86-P120+	16	1280
8 Robotech Cobra XLT P-133	5	2	July 96	84	189	[3]	$2199	Pentium-133	16	1280
9 NMC PCW P100	–	1	current	84	168	[3]	$1749	Pentium-100	16	850
10 Netis N5133DPS	6	3	May 96	84	185	[3]	$1998	Pentium-133	16	1624
11 Tempest Pentium Giga Media P5-100	9	8	Mar 96	83	132	[3]	$1720	Pentium-100	16	1270
12 Micro Express MicroFlex-PCI/5133	7	5	Apr 96	83	190	[3]	$1999	Pentium-133	16	1624
13 Xi P133MTower SP	14	2	July 96	83	193	[3]	$2249	Pentium-133	16	1280
14 Maximus Magna Media P-166	11	2	July 96	82	201	[3]	$2499	Pentium-166	16	2140
15 Diamond OfficeMate P5120	12	2	July 96	82	164	[3]	$1645	Pentium-120	16	1624
16 Compaq ProLinea 575e	13	4	May 96	82	86	76/71	$1599	Pentium-75	8	630
17 NEC PowerMate V100	–	1	current	82	163	70/68 [3]	$2445	Pentium-100	16	1621
18 Acma zPower 100	19	2	July 96	82	131	[3]	$1999	Pentium-100	8	1280
19 DTK Quin 54M/P100	16	6	Mar 96	82	148	68 [3]/ [3]	$2050	Pentium-100	16	1080
20 NEC Ready 9617	–	1	current	82	152	70/64 [3]	$2448	Pentium-133	16	1626

BEST BUY

[1] Percent contribution to overall rating: price (25); reliability (25); features (20); PC WorldBench score (15); service and support (15).
[2] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktop, Budget Desktop, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available July 31). You can also order a previous month's Top 20 chart with capsule reviews plus Features Comparison and Test Report ($4.50) and individual capsule reviews with Features Comparison and Test Report ($1.50 each). Prices effective for the

Dell OptiPlex GXM 5100
Networking on a budget.



3 Gateway 2000 P5-120
New CD-ROM drive, lower price.

4 Vektron Multimedia P-100
Huge bang for your buck.

5 Quantex QP5/100 M-3
Lots of multimedia for the money.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number[2]	Reader service no.	Comments (Recommended as home system)
6X	ISA, PCI	15"/.28	800/613-3355	3391	674	Newest entry-level Dimension offers quality and speed at a good price; no speakers or modem.
4X	ISA, PCI	15"/.28	800/613-3355	3409	675	Good for budget-conscious buyers who want a solid PC with built-in networking.
8X	ISA, PCI	15"/.25	800/846-2000	3392	676	Another $120 off solidifies well-built PC's standing in the Best Buy ranks.
6X	ISA, PCI	15"/.25	800/725-0026	3325	677	Amazingly low price, huge hard drive, full multimedia; Vektron lacks reliability record.
8X	ISA, PCI	15"/.28	800/896-4898	3353	678	Great value, recently upgraded tech support; still, company's PC reliability is in question.
8X	ISA, PCI	15"/.28	800/223-6571	3410	679	$250 price drop lands powerful PC on the Budget chart; strong PC reliability score.
4X	ISA, PCI	15"/.28	800/989-9900	3411	680	Dirt-cheap PC with P-120–type power, but getting good support can be difficult.
6X	ISA, PCI	17"/.28	800/255-2215	3393	681	Fast, inexpensive PC for the home office, but documentation is spotty and support weak.
4X	ISA, PCI	15"/.28	800/800-4662	3412	682	Plain-vanilla minitower delivers a lot for the money, but most components are generic.
4X	ISA, PCI	15"/.28	800/577-7526	3394	683	Impressive configuration for under $2000, but Netis's reliability isn't established.
4X	ISA, PCI	15"/.28	800/818-5163	3356	684	Good price for highly expandable multimedia PC; reliability record is unknown.
4X	ISA, PCI	15"/.28	800/989-9900	3361	685	Fast system for under $2000; early returns indicate below-average reliability.
6X	ISA, PCI	17"/.26	800/432-0486	3398	686	Great performance, $100 price drop, very expandable; unfortunately, tech support is limited.
6X	ISA, PCI	15"/.28	800/888-6294	3384	661	Super price for loaded P-166 with lots of expansion room; also on Power chart.
4X	ISA, PCI	15"/.28	800/989-7253	3397	688	Inexpensive, no-frills business machine performs okay but lacks sound and speakers.
—	ISA, PCI	15"/.28	800/345-1518	3366	689	Solid budget system from a reputable vendor; extras like a CD-ROM drive are optional.
6X	ISA, PCI	15"/.28	800/632-4636	3413	690	Solid value system with nice design features, but graphics system is weak.
4X	ISA, PCI	15"/.28	800/786-6888	3400	691	$96 price drop; full featured; PC Card slots; performance sluggish for a P-100.
6X	ISA, PCI	15"/.28	800/289-2385	3351	692	Good value; increasingly negative feedback about company's PC reliability hurts standing.
6X	ISA, PCI	15"/.28	800/632-4636	3414	693	Great design for the home, but expensive for a P-133 that runs like a so-so P-100.

U.S. and Canada. Foreign orders are $15 for advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews.
[3] Fewer than 100 Reliability and Service Monitor responses. Rating is based on responses for this company and the average of responses for all companies. No score is shown if we received fewer than 20 reliability or service responses.

For more information about all products in this table, circle reader service no. 908.

Top 20 Budget Desktops

WHILE DELL GRABS THE TOP TWO SPOTS, GATEWAY and Micron are gaining ground. Dell discontinued its OptiPlex GL+575, which is replaced on the chart by the second-ranked $2223 OptiPlex GXM 5100. The $1979 Gateway 2000 P5-120, $120 cheaper this month, moves up to number three. Meanwhile, the sixth-place $2449 Micron P120 Millennia, formerly priced as a power desktop, joins the Budget Top 20 after a $250 price drop.

New budget PCs this month include National MicroComputers' $1749 NMC PCW P100, a bargain-basement multimedia PC with a long list of extras. Be aware, though, that few of those extras bear brand names. On the other hand, the $2445 NEC PowerMate V100 has mostly first-class components. It comes with a sharp NEC monitor, and the design includes a unique suspend button. The V100's main weakness is its high price.

Dell Dimension P100t

LAST REVIEWED: July 1996

PROS: Fast, inexpensive, highly upgradable

CONS: No speakers, no full-motion video acceleration

The $1849 Dimension P100t minitower is fast, well built, and easy to upgrade. With a PC WorldBench score of 173, the P100t delivers some of the best performance for the money of any system we've seen, regardless of CPU. However, it's not a multimedia PC. Although it comes with a 16-bit sound card, speakers are optional; and despite the system's 2MB of graphics memory, its integrated Trio64 graphics chip can't speed up full-motion video clips. Consider spending an extra $250 for some basic speakers and a 2MB video-enabled board. Even with a slightly higher price, the Dimension P100t would rank at the top of our Budget chart.

Dell OptiPlex GXM 5100

NEW THIS MONTH

PROS: Fast, well designed, built-in networking, good service and support

CONS: No application software, no modem

The $2223 OptiPlex GXM 5100 is aimed at the business PC buyer who wants the built-in networking features of an OptiPlex but doesn't have a lot to spend. The GXM 5100 is an entry-level version of the fourth-ranked power system, the OptiPlex GXMT 5166. Its PC WorldBench score of 170 puts it among the fastest Pentium-100s we've tested; the extra speed is due largely to the system's 16MB of EDO RAM and 256K of pipeline-burst cache. The graphics and 16-bit sound controllers are integrated on the motherboard, but unlike other entry-level Dell PCs, including the top-rated Dimension 100t, this OptiPlex has a Trio64V+ graphics chip that accelerates full-motion video (others use a plain Trio64 chip). In addition, the GXM 5100 uses EDO DRAM for its frame buffer to speed up screen redraws, scrolling, and a number of other video functions.

Dell OptiPlex GXM 5100

Because graphics and sound are integrated, the compact desktop case has plenty of room for expansion, including five add-in card slots (two are shared PCI/ISA slots) and one drive bay. Dell's easy-open case makes upgrading simple, and there's very little internal cable clutter.

Dell continues to receive high marks for reliability and service. Its OptiPlex line comes standard with a three-year warranty on parts and labor as well as nonstop toll-free technical support. In our calls to Dell's support lines, we've found the staff knowledgeable and patient. The detailed, user-friendly documentation is a boon for do-it-yourselfers. About the only thing the overall package lacks is application software to get you up and running.

Gateway 2000 P5-120

LAST REVIEWED: March 1996

PROS: Good performance, 8X CD-ROM drive, Microsoft Office Professional

CONS: No sound

Another price drop—$120 this time—solidifies the P5-120 as Gateway's best budget PC. The $1979 price is great for what you get, but you'll need to cough up $100 more for a sound card and speakers. If you want a 28.8-kbps fax-modem, add another $149. People on a budget may also want to take a serious look at Gateway's entry-level $1569 P5-75 (reviewed in March); and the $2034 Gateway P5-100 Family PC (reviewed in April), which comes with speakers and a modem.

Vektron Multimedia P-100

LAST REVIEWED: March 1996

PROS: Ultralow price; big hard drive; CD-ROM drive, sound, and speakers

CONS: One-year warranty, no weekend support

The $1695 Vektron Multimedia P-100 is a real bargain. PCs with this much hardware usually go for hundreds of dollars more. Its loaded configuration includes a 2.1GB hard drive and a 6X CD-ROM drive. We don't yet have enough feedback to gauge the company's reliability and service. In our experience, times on hold can be long; a recorded message encouraged us to fax or e-mail questions to the company. But if you're good with PCs and can fix problems when they arise, Vektron merits your consideration.

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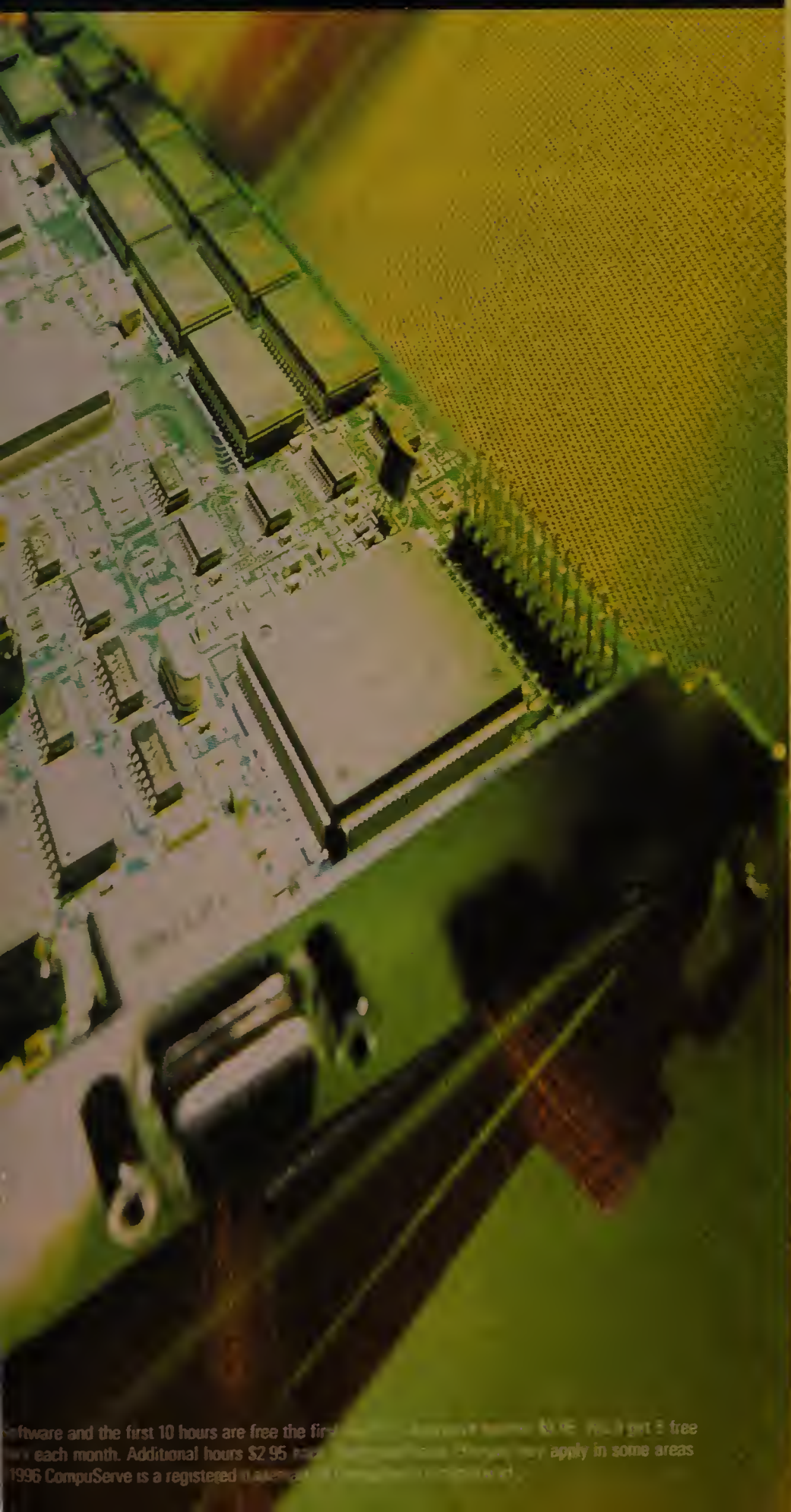

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5 Quantex QP5/100 M-3

LAST REVIEWED: April 1996

PROS: Good P-100 performance, full multimedia, fax-modem, 8X CD-ROM drive

CONS: Low reliability and service scores

The $1849 QP5/100 M-3 family-oriented multimedia system comes with a bunch of games, PerfectWorks integrated software, and several online start-up kits. It's a good choice for home offices where the PC is also used for entertainment. Features like a 1.6GB hard drive, an 8X CD-ROM drive, and a 28.8-kbps fax-modem with voice mail earn this minitower a Best Buy.

If you want a little extra power, consider the $2099 QP5/120 M-4, tested in July. It's fast, with the same high-quality design as the QP5/100 M-3, and it comes with a 17-inch monitor, a 2GB hard drive, and an 8X CD-ROM drive.

6 Micron P120 Millennia

LAST REVIEWED: March 1996

PROS: Highly expandable; reliable; roomy hard drive; 8X CD-ROM drive

CONS: Expensive for a budget PC

With a big $250 price drop, the $2449 P120 Millennia now qualifies for a spot on the Budget chart. It's a solid configuration from a vendor that rates high for system reliability. Unlike the Best Buy Gateway P-120, the Millennia comes with sound and speakers, but it's also more expensive. The P100 Millennia is also a good budget system, but the money you save on the slower processor—less than $50—is hardly worth the loss in performance.

7 Micro Express MicroFlex-686/P120+

NEW THIS MONTH

PROS: Great price, good performance, good expandability

CONS: Internal clutter, poor documentation

This Cyrix-based minitower replaces the MicroFlex-686/P120+ we reviewed in July. With 16MB instead of the earlier model's 32MB, this version is still more than powerful enough for most everyday tasks. And at $1399 it's practically a steal. The latest 686/P120+ comes with a smaller monitor (15 inches) and a less expensive graphics board than the previous system. Don't feel short-changed, though; the STB Powergraph 64 Video with 2MB of EDO DRAM is a top board.

MicroFlex-686/P120+

The MicroFlex scored 175 in our PC WorldBench test suite—as fast as some of the top Pentium-120 systems we've tested. The sturdy case houses a 4X CD-ROM drive and a generic ESS 16-bit sound card (speakers are not included). There's plenty of room for expansion, but cable clutter makes it a hassle to reach the four free SIMM sockets, the six free add-in card slots, and the four open drive bays. In addition, the keyboard feels a bit flimsy, and documentation is extremely sparse.

Micro Express offers a sound two-year warranty on parts and labor, but getting through to technical support can be impossible, especially after normal business hours. After hours you have to leave a message and wait for a callback. Unfortunately, the recorded message says nothing about a return call, let alone when someone will get around to your problem.

8 Robotech Cobra XLT P-133

LAST REVIEWED: July 1996

PROS: Fast, good price, full multimedia, 17-inch monitor, 28.8-kpbs Boca fax-modem

CONS: Limited support hours, poor documentation, no data to gauge service and reliability

9 NMC PCW P100

NEW THIS MONTH

PROS: Great price, good P-100 performance, 28.8-kbps fax-modem

CONS: Dim monitor, cable clutter, no bundled apps, unknown record for service and reliability

National MicroComputers' NMC PCW P100 is a nondescript minitower filled with no-name parts. But at just $1749, it's a bargain we can't overlook. Its PC WorldBench score of 168 is above average for a P-100, and the system's multimedia features include a 4X CD-ROM drive, 16-bit sound, speakers, and a fax-modem.

NMC

The generic components used to keep the cost of this computer down include an Ark Logic–based graphics card with 2MB of DRAM, an ArchTek 28.8-kbps fax-modem, and a pair of plain-vanilla stereo speakers labeled simply Computer Speaker DC-691. During testing none of these components hindered our evaluation, but they were not impressive either. Our only real disappointment was the 15-inch CTX monitor with its dull, fuzzy display.

National MicroComputers sells its systems with a three-year warranty, but telephone support is limited. Toll-free help is available 10 hours on weekdays but not at all on weekends.

10 Netis N5133DPS

LAST REVIEWED: May 1996

PROS: Under $2000, good Pentium-133 performance, lots of features

CONS: One-year parts warranty, unknown record for service and reliability

11 Tempest Pentium Giga Media P5-100

LAST REVIEWED: March 1996

PROS: Low price ($1720), CD-ROM drive, sound, speakers, fax-modem

CONS: Slow for a Pentium-100, unknown record for service and reliability

12 Micro Express MicroFlex-PCI/5133

LAST REVIEWED: April 1996

PROS: Fast and inexpensive ($1999) for a P-133; big hard drive; CD-ROM drive; sound; speakers

CONS: Tech support hard to reach, requires a callback after business hours

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13 Xi P133MTower SP

LAST REVIEWED: July 1996

PROS: Fast, good price, 17-inch monitor, 6X CD-ROM drive, highly expandable

CONS: Limited tech support hours, unknown track record for service and reliability

14 Maximus Magna Media P-166

LAST REVIEWED: July 1996

PROS: Fastest budget PC; sturdy; loaded configuration includes sound, speakers, CD-ROM drive

CONS: One-year parts warranty, unknown track record for service and reliability

15 Diamond OfficeMate P5120

LAST REVIEWED: July 1996

PROS: Low price, sturdy design, 14.4-kpbs fax-modem

CONS: No sound card, no application software, poor documentation

16 Compaq ProLinea 575e

LAST REVIEWED: May 1996

PROS: Well built, low price, great reliability record

CONS: Very slow; small hard drive; no CD-ROM drive; no secondary cache

17 NEC PowerMate V100

NEW THIS MONTH

PROS: Roomy hard drive, 6X CD-ROM drive, suspend button, solid support

CONS: Sluggish graphics system

The $2445 V100 is a budget model in NEC's PowerMate line. Like its high-end siblings, including the number 13 power desktop PowerMate P166, the V100 features attractive design and strong support policies. It's not the least-expensive budget desktop, but NEC's craftsmanship and attention to detail make the extra outlay worthwhile. One nice touch: A suspend button located on the front panel lets you save your current session to the hard disk and cut power to the system in one easy step. The next time that you boot up, Windows 95 will resume where you left off. The system also includes a microphone, which comes in handy for annotating documents, and a clear-sounding set of NEC speakers.

With a PC WorldBench score of 163, the PowerMate V100 isn't the fastest Pentium-100 system that we have tested, but its speed is above average for its processor class. One possible performance bottleneck is the Alliance ProMotion video controller that comes with this computer. In our experience, the Alliance chip provides pleasing images, but it doesn't accelerate software applications the way that a number of other chips do.

NEC PowerMate V100

The PowerMate V100's comprehensive on-screen documentation provides step-by-step instructions for using and upgrading the computer. Unfortunately, the system doesn't come with any application software. NEC's support policies for its PowerMates are among the best in the business: You get a three-year warranty, free on-site service for the first year, and toll-free phone support around the clock. For buyers needing an affordable, moderate performer with a no-nonsense setup, the V100 is a good choice.

18 Acma zPower 100

LAST REVIEWED: July 1996

PROS: Two PC Card slots, full multimedia, 28.8-kbps fax-modem, well built

CONS: Sluggish performance for a Pentium-100

19 DTK Quin 54M/P100

LAST REVIEWED: March 1996

PROS: Good upgradability, full multimedia, 6X CD-ROM drive

CONS: Some cable clutter, increasing number of negative reliability reports

20 NEC Ready 9617

NEW THIS MONTH

PROS: Large hard drive, 6X CD-ROM, sound, speakers, voice fax-modem, lots of software

CONS: Slow for a Pentium-133, scant 1MB of graphics memory, only one year of tech support

The $2448 Ready 9617 is an affordable, feature-laden system designed for home office workers who share the computer with their kids. The machine's full complement of multimedia features, including pleasant-sounding speakers and a 28.8-kbps fax-modem with voice mail support, make it a terrific value. But with a PC WorldBench score at the very bottom of its Pentium-133 processor class, the NEC Ready 9617 isn't likely to capture the imagination or pocketbooks of speed-hungry number crunchers.

This compact minitower's tightly integrated EnergyStar features allow it to handle fax and phone services round the clock with minimal power consumption. Channel surfers will feel comfortable with the bundled remote control, a unique perk they can use to play CDs, operate the speakerphone, and listen to voice mail. The extensive software bundle includes Microsoft Works, Money, Publisher, and Encarta 96, as well as Netscape Navigator for accessing the Net.

NEC Ready

Before rolling up their sleeves and getting to work, users can learn about their PC from NEC's interactive on-screen documentation. The rugged chassis has four easily accessible add-in slots. You can get to the two free drive bays simply by popping off the stylish front panel.

NEC cut a few subtle corners to keep the price down. For instance, the MultiSync C500 15-inch monitor is sharp and clear, but not as fine as the PowerMate line's flat-faced MultiSync XV15+. And with only 1MB of graphics DRAM, the system can't display true color at 800 by 600 resolution. Also, the bundled speakers aren't as powerful as those found on the PowerMates.

NEC offers Ready customers nonstop toll-free technical support, but only for the first year; after that you're on your own. Moreover, the standard warranty on a Ready PC runs for only one year.

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THE TOP 20

PC WORLD

NOTEBOOK PCs

1 Dell Latitude XPi P133ST
As fast as a notebook goes.

POWER SYSTEMS

		Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Multi-media
1	Dell Latitude XPi P133ST	–	1	current	94	166	79/70	$5099	Pentium-133	24	1215	sound
2	Gateway 2000 Solo S5-120XL	1	2	July 96	92	153	74/65 [4]	$5599	Pentium-120	40	1358	sound/CD
3	Toshiba Tecra 700CT	2	3	June 96	91	141	85/80	$5298	Pentium-120	16	1215	sound/CD
4	Toshiba Satellite Pro 400CDT	3	8	Mar 96	91	124	85/80	$4458	Pentium-75	16	810	sound/CD
5	WinBook XP5 P120	5	5	Apr 96	88	146	58/73	$3499	Pentium-120	16	1295	sound
6	Micron Millennia Transport P133	–	1	current	88	163	[4]	$4998	Pentium-133	16	1215	sound/CD
7	AST Ascentia J30	6	2	July 96	87	117	70/68 [4]	$3299	Pentium-100	8	810	sound
8	Toshiba Portégé 610CT	7	7	Mar 96	87	99	85/80	$3949	Pentium-90	8	720	sound
9	DTK DTN-5A120C	–	1	current	85	144	[4]	$3695	Pentium-120	16	810	sound/CD
10	Texas Instruments TravelMate 5100	8	4	Mar 96	84	125	64 [4]/ [4]	$3799	Pentium-90	16	1160	sound

BUDGET SYSTEMS

1	Toshiba Satellite 100CS	1	3	June 96	91	87	85/80	$1999	Pentium-75	8	540	–
2	Toshiba Satellite T2130CS	2	6	Mar 96	91	65	85/80	$1599	DX4-75	8	503	–
3	Toshiba Satellite T2130CT	3	2	June 96	89	66	85/80	$2099	DX4-75	8	503	–
4	Mega Image MegaBook 880	5	3	June 96	88	118	[4]	$2159	Pentium-90	16	543	sound
5	Dell Latitude XPI P75D	4	3	Mar 96	87	106	79/70 [4]	$2499	Pentium-75	16	540	–
6	NEC Versa 550D	–	1	current	84	75	71/ [4]	$1799	Cx5x86-100	8	540	–
7	Sharp PC 3020	6	3	June 96	84	79	[4]	$1799	Cx5x86-100	8	500	–
8	WinBook XP5 P75	–	1	current	83	91	58/73	$1999	Pentium-75	8	540	–
9	Magitronic 550 Series	–	1	July 96	83	117	[4]	$2599	Am5x86-P75	20	543	sound/CD
10	CTX EzBook 600CDT P75	–	1	current	80	84	[4]	$2399	Pentium-75	8	540	sound/CD

BEST BUY

[1] Percent contribution to overall rating for power notebook: PC WorldBench score (22); reliability (22); features and design (16); price (14); service and support (10); battery (8); weight (8). Percent contribution to overall rating for budget notebooks is the same except for price (22) and PC WorldBench score (14). [2] CA=color active, CD=color dual-scan. [3] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktop, Budget Desktop, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available July 31). You can also order a previous month's Top 20 chart with capsule reviews plus

Gateway 2000 Solo S5-120XL
Filled to capacity with extras.

1 Toshiba Satellite 100CS
High-quality Pentium at a good price.

2 Toshiba Satellite T2130CS
Great notebook is priced to move.

Weight (pounds)	Battery life (hours)	Screen type/ size [2]	Vendor contact number	Fax reprint number [3]	Reader service no.	Comments
7.2	5:20	CA/11.3"	800/613-3355	3764	694	Fastest notebook we've tested; multimedia version is on the way.
8.8	5:40	CA/10.4"	800/846-2000	3758	695	Desktop PC that fits in a briefcase; being replaced by a P-133 model.
10.4	4:43	CA/11.3"	800/457-7777	3751	696	Best in high-end line; big bright screen; integrated AC adapter; dual-scan model also strong.
9	4:21	CA/10.4"	800/457-7777	3728	697	Feature-laden, a good primary computer, but P-75 CPU slower than most new power notes.
7.4	6:19	CA/10.3"	800/468-2162	3736	698	Good deal on fast P-120; comfortable keyboard, long battery life; troubling reliability score.
9	3:22	CA/11.3"	800/223-6571	3765	699	Micron's first note is fast and loaded, but battery life can't compare with top power notes.
6.6	5:12	CA/10.4"	800/876-4278	3759	700	Nice looking; long battery life; light; built-in modem; could be even better with another 8MB.
6.4	5:09	CA/9.5"	800/457-7777	3752	701	Few subnotes make the grade, but this one's comfortable; nice screen, video, sound.
9.4	2:16	CA/10.4"	800/289-2385	3766	702	Fairly generic multimedia note, but fast, with a good price; reliability and service unknown.
7.4	5:06	CA/10.4"	800/848-3927	3714	703	$100 price drop; TI will soon replace this well-designed PC with upgraded new model.
7.6	3:35	CD/10.4"	800/457-7777	3754	704	If you need an inexpensive, no-frills Pentium notebook, this one is perfect.
7.2	3:01	CD/10.4"	800/457-7777	3744	705	Bargain notebook is being replaced, but retailers may still have some in stock.
7.2	5:29	CA/10.3"	800/457-7777	3760	706	Nearly identical to no. 2 except for active screen; also being put out to pasture.
7.4	3:06	CA/10.3"	800/250-1876	3755	707	$236 price drop on cheap, fast notebook with active screen; company's reliability unknown.
7.4	3:28	CD/10.3"	800/613-3355	3713	708	16MB gives this notebook a performance boost but doesn't extend battery life much.
7.4	2:59	CD/10.4"	800/632-4636	3767	709	Sleek, sturdy design with crisp screen; very affordable, but you sacrifice performance.
7.2	4:28	CD/10.4"	800/237-4277	3757	710	Low-cost alternative to Pentium-75 notebooks features long battery life.
7.4	4:05	CD/10.4"	800/468-2162	3768	711	Affordable Pentium with 14.4-kbps fax-modem; negative feedback on WinBook reliability.
8.6	2:24	CA/10.4"	770/849-0667	3769	712	Inexpensive for multimedia notebook with extra memory; battery life is disappointing.
9.2	6:12	CA/10.4"	800/888-9052	3770	713	Multimedia notebooks don't usually come this cheap; long battery life is another plus.

Features Comparison and Test Report ($4.50) and individual capsule reviews with Features Comparison and Test Report ($1.50 each). Prices effective for the U.S. and Canada. Foreign orders are $15 for advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews. [4] Fewer than 35 Reliability and Service Monitor responses. Rating is based on responses for this company and the average of responses for all companies. No score is shown if we received fewer than 20 reliability or service responses.

For more information about all products in this table, circle reader service no. 909.

Top 20 Notebooks

THIS MONTH MARKS THE FIRST TIME A PENTIUM-133 system has qualified for our power notebook chart. In fact, there are two of them—the $5099 Dell Latitude XPi P133ST, and the $4998 Micron Millennia Transport. Also new to the power chart is the $3695 DTK DTN-5A120C, a fairly generic multimedia portable with an attractive price tag.

Once again, the budget notebook chart changes by attrition. Three notebooks from July—the AST Ascentia 950N, the MPC TouchNote 1000, and the ZDS Z-Note MX—have been discontinued. Filling the void are the $2399 CTX EzBook 600CDT P75, the $1799 NEC Versa 550D, and the dual-scan $1999 WinBook XP5 P75.

Power Notebooks

1 Dell Latitude XPi P133ST

NEW THIS MONTH

PROS: Fastest notebook we've tested, excellent battery life, large screen, light weight

CONS: No internal CD-ROM option, cramped keyboard, somewhat reckless trackball

With a PC WorldBench score of 166, the $5099 Latitude XPi P133ST is our top-performing portable. Its speed, 5.3-hour battery life, and 7.2-pound travel weight make it our number one power notebook.

Dell Latitude P133ST

The XPi's NeoMagic video chip has a fast 128-bit core and 1MB of embedded video RAM to accelerate Windows 95. The crisp 11.3-inch active-matrix screen displays your work at 800 by 600 resolution. Overall design is sturdy, but the keyboard is cramped, and the trackball proved a bit unruly. Bundled software includes LapLink and SideKick 95. As we went to press, Dell was introducing a new multimedia line to replace its XPi series.

2 Gateway 2000 Solo S5-120XL

LAST REVIEWED: July 1996

PROS: Very fast, tons of memory, long battery life, CD-ROM drive

CONS: Most expensive on chart

We tested the $5599 Solo P-120 in its "Best Buy" configuration, stuffed with 40MB of RAM and a 1.3GB hard drive. Gateway 2000 is already replacing this notebook with a Pentium-133 version.

The sleek, rugged Solo has an active-matrix super-VGA screen, a 28.8-kbps PC Card fax-modem, a removable 4X CD-ROM drive, and a responsive GlidePoint touchpad. Additional goodies include a pair of headphones, integrated 16-bit sound and speakers, a carrying case, and Microsoft Office 95 Professional.

3 Toshiba Tecra 700CT

LAST REVIEWED: June 1996

PROS: Good performance, long battery life, 4X CD-ROM drive, top-rated reliability

CONS: Expensive, a bit heavy

4 Toshiba Satellite Pro 400CDT

LAST REVIEWED: March 1996

PROS: Quite fast for P-75; long battery life; 4X CD-ROM drive; highly rated reliability

CONS: Expensive for its CPU class

5 WinBook XP5 P120

LAST REVIEWED: April 1996

PROS: Fast, light, amply configured, very long battery life

CONS: One-year warranty, low reliability rating

6 Micron Millennia Transport P133

NEW THIS MONTH

PROS: Two expansion bays, CD-ROM drive, dual input devices, fax-modem, video-out ports

CONS: Awkward mouse buttons, poor sound quality

Micron, maker of the highly rated Millennia line of desktop PCs, goes mobile with the $4998 Millennia Transport P133. With a PC WorldBench score of 163, it's our second-fastest performer, behind the top-ranked Dell. It costs less than the Latitude, but you get less RAM and 2 hours less battery life. But that's where the trade-offs end. The Transport comes loaded with features, including dual expansion bays that accommodate either a battery or a drive, a crisp 11.3-inch active-matrix screen that runs at 800 by 600, a 28.8-kbps Motorola fax-modem with cellular and paging connectivity, infrared ports front and rear, and dual video output for on-the-road presentations. Micron even throws in extras like a second lithium ion battery, a carrying case, and Microsoft Office Professional.

Micron Transport

The Transport is unique in including two pointing devices: a touchpad and an eraserhead stick. Unfortunately, the mouse buttons, placed at the front edge of the unit, can be difficult to use.

7 AST Ascentia J30

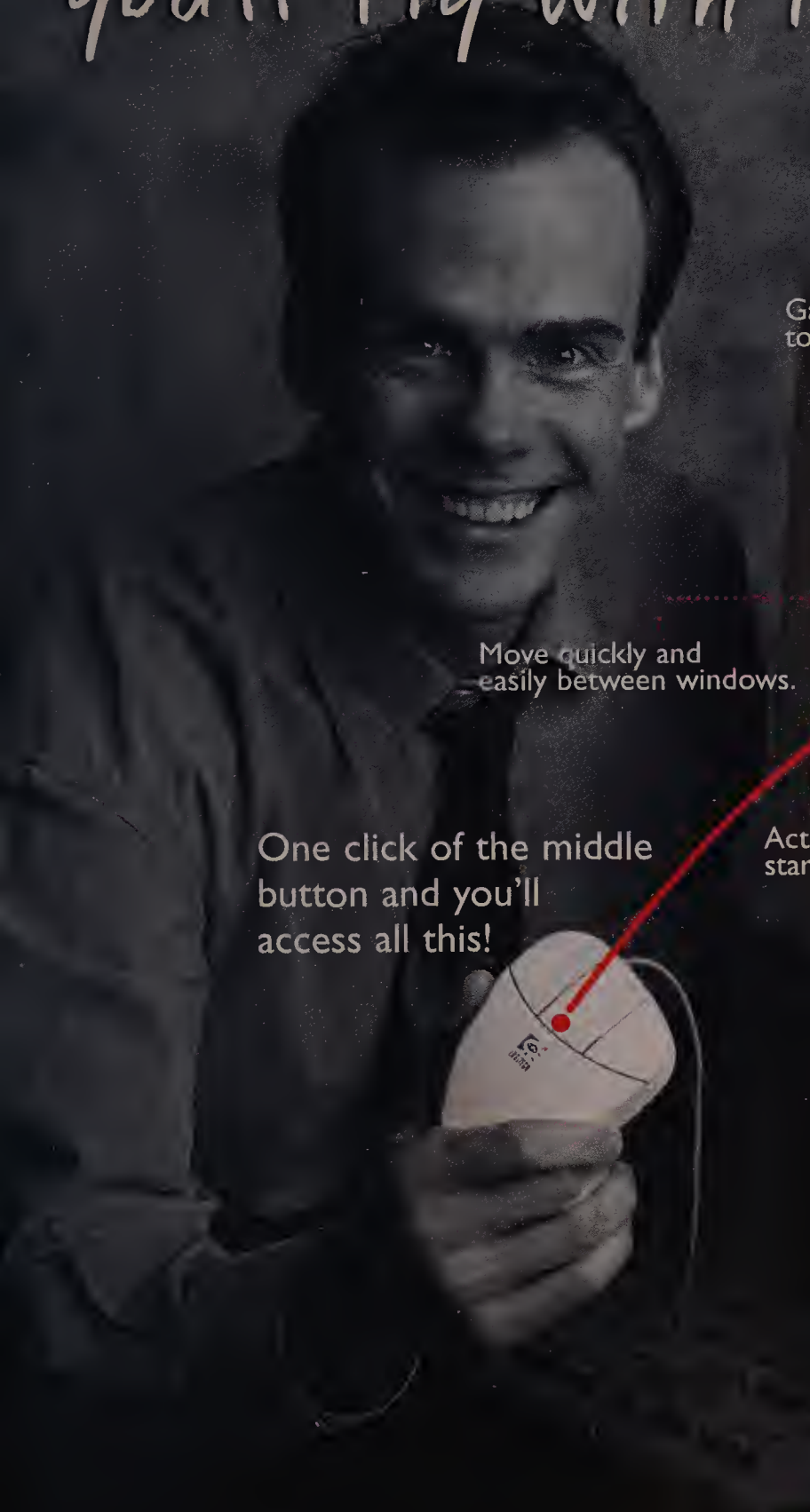
LAST REVIEWED: July 1996

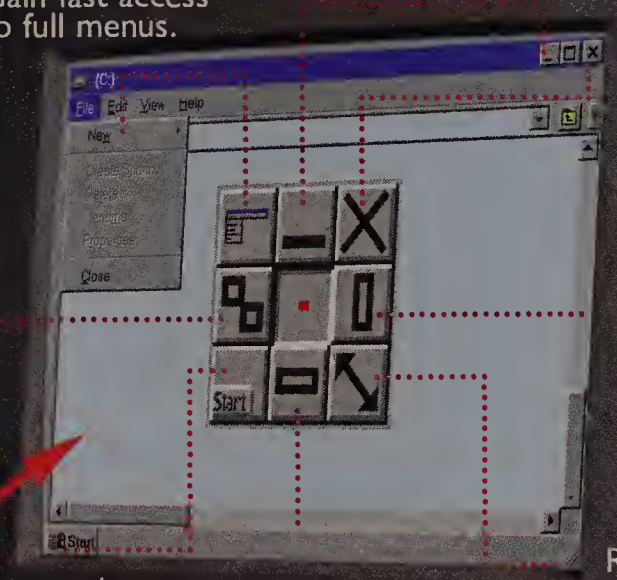
PROS: Nice super-VGA screen, long battery life, light weight

CONS: Slothful performance for a P-100 notebook

"If you run Windows 95, you'll fly with MouseMan 96."

B. Featherstone
Aviation Designer





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MouseMan® 96 by Logitech is the only mouse optimized for Windows® 95. It's everything you'd expect from the world's leading mouse maker, and more! MouseMan 96 includes the revolutionary HyperJump™ technology - which allows you to access eight important Windows 95 commands with a single click of the middle button. And you still get superb Logitech design, Plug and Play installation, and three button programmability. For information, or the dealer nearest you, call **1-800-732-3105,** or for information by fax call **1-800-245-0000,** Document 4030.

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LOGITECH

Products people love

8 Toshiba Portégé 610CT

LAST REVIEWED: March 1996

PROS: Sturdy subnotebook with good sound and video

CONS: Minimal 8MB of RAM yields below-average performance

9 DTK DTN-5A120C

NEW THIS MONTH

PROS: Bright screen, sturdy design, 28.8-kbps fax-modem, infrared port

CONS: Limited support hours, no weekend support, 2-hour battery life

The $3695 DTK DTN-5A120C is a generic notebook; we've seen this exact design from Altura, Broadax, and Magitronic. Like the Broadax NP8662T (see Notebook Snapshots), this Pentium-120 notebook manages only about 2 hours of battery life. But DTK throws in a few more extras, like a New Media 28.8-kbps NetSurfer PC Card modem. And with a PC WorldBench score of 144, the DTN-5A120C is among the fastest Pentium-120 portables in its configuration (16MB of RAM, active-matrix screen, and 256K of cache).

DTK

10 Texas Instruments TravelMate 5100

LAST REVIEWED: March 1996

PROS: Fast P-90 performance, 5-hour battery life, big hard drive

CONS: Pricey, being replaced by newer unit

Budget Notebooks

1 Toshiba Satellite 100CS

LAST REVIEWED: June 1996

PROS: Good deal on a quality Pentium-75 notebook from a reliable vendor, nice keyboard

CONS: Hard drive not removable

Toshiba's Satellite 100CS is a perfect first notebook. You get Pentium power, a good dual-scan screen, and excellent design for just $1999, and the system is well made by a reputable vendor. Because the 100CS comes with only 8MB of RAM, it's a bit sluggish. An 8MB upgrade module costs $459 and should boost performance by about 15 percent.

2 Toshiba Satellite T2130CS

LAST REVIEWED: March 1996

PROS: Least expensive on chart, nice dual-scan screen, good keyboard

CONS: Slow; outdated CPU

The $1599 T2130CS is a good machine for people who want to take their documents and basic business presentations on the road. Its screen and keyboard are of high quality, and its eraserhead pointing device is easy to use. As we went to press, Toshiba was discontinuing the T2130 series, but retailers still have some.

3 Toshiba Satellite T2130CT

LAST REVIEWED: June 1996

PROS: Long 5.5-hour battery life, nice active-matrix screen, comfortable keyboard

CONS: Slow; outdated DX4-75 CPU; Toshiba discontinuing T2130 line

4 Mega Image MegaBook 880

LAST REVIEWED: June 1996

PROS: Good performance thanks to 16MB of RAM; active-matrix super-VGA screen

CONS: Unknown track record for service and reliability

5 Dell Latitude XPi P75D

LAST REVIEWED: March 1996

PROS: Good design and construction, reliable, fast

CONS: Short battery life considering the 16MB of memory

6 NEC Versa 550D

NEW THIS MONTH

PROS: Very low price, nice overall design, good display

CONS: Slow, no bundled software

The $1799 NEC Versa 550D is a solid performer that doesn't cos much. You can attribute the low price to its inexpensive Cyrix 5x8 CPU. With 8MB of RAM and a 540MB hard drive, the Versa 550D achieved a WorldBench score of 75—average for its class. Battery life, just shy of 3 hours, is also acceptable. And at 7.4 pounds including the AC adapter, the Versa's pretty easy to carry.

The curved design is so smooth, you may miss some of the exterior buttons if you don't look closely. Latches are set flush with the casing, protected from damage and adding to the system's overall polished look.

NEC Versa 550D

We also liked the range of brightness and contrast we could achieve on the 10.4-inch dual-scan dis play. A trackball with large mouse buttons sits in the center of the wrist rest. The buttons work fine, but the trackball's rough texture creates a disconcerting grinding sensation.

7 Sharp PC 3020

LAST REVIEWED: June 1996

PROS: Inexpensive ($1799), built-in fax-modem, good battery life

CONS: Slow

8 WinBook XP5 P75

NEW THIS MONTH

PROS: Inexpensive, solid Pentium-75 performance, good battery life

CONS: Dull display

Like all WinBooks, the latest XP5 P75 is sturdy and has a comfort- able, responsive keyboard. But this $1999 model is particularly

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Product	CRT Size/ Viewable	Dot Pitch Aperture Grille*	Max. NI Resolution	OnView Controls	TCO Certified	MSRP
ViewSonic 15G	15"/13.8"	0.28mm	1,280 x 1,024	Yes		$425
ViewSonic 15GS	15"/14.0"	0.28mm	1,280 x 1,024	Yes	Yes	$449
ViewSonic 15GA	15"/14.0"	0.27mm	1,280 x 1,024	Yes	Yes	$499
ViewSonic 17GS	17"/16.0"	0.27mm	1,280 x 1,024	Yes	Yes	$749
ViewSonic 17GA	17"/16.0"	0.27mm	1,280 x 1,024	Yes	Yes	$799
ViewSonic GT770	17"/15.9"	0.25mm*	1,280 x 1,024	Yes		$899
ViewSonic 20G	20"/18.4"	0.28mm	1,600 x 1,280		Yes	$1,395
ViewSonic GT800	20"/19.1"	0.30mm*	1,600 x 1,280	Yes		$1,899
ViewSonic G810	21"/20.0"	0.25mm	1,600 x 1,280	Yes		$1,745

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ViewSonic 17GA April 1996

ViewSonic PT770 April 1996

ViewSonic PT810 April 1996

ViewSonic 15GA April 1996

ViewSonic 15G April 1996

ViewSonic 17GA February 1996

ViewSonic 17GA December 1995

Circle 224 on reader service card

WinBook

affordable because it comes with a 10.4-inch dual-scan display (the XP5 P75 reviewed in June had an active screen). Its list of features is typical of today's budget notebooks—Pentium-75 CPU, 8MB of RAM, 540MB hard drive—but WinBook also throws in a 14.4-kbps internal fax-modem for data communications (it's not fast enough for browsing the Web). You can't add a second battery, but the single lithium ion battery lasts for over 4 hours. WinBook's eraserhead pointing device is excellent, but we were a bit disappointed in the quality of the screen—it's one of the dullest we've seen.

9 Magitronic 550 Series

LAST REVIEWED: July 1996

PROS: Infrared port, built-in sound, 4X CD-ROM drive

CONS: Short battery life, poor documentation

10 CTX EzBook 600CDT P75

NEW THIS MONTH

PROS: Inexpensive for what you get; sturdy; 2X CD-ROM drive; long battery life

CONS: Heavy, poor documentation

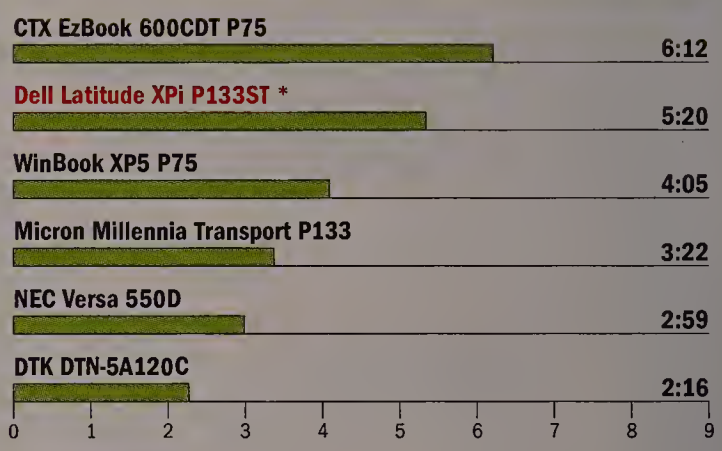
The CTX EzBook 600CDT P75 has a lot going for it, including a remarkable price. Considering the 2X CD-ROM drive and active-matrix screen, $2399 is a great deal. With its Pentium-75 CPU and 8MB of RAM, the CTX scored 84 in our PC WorldBench tests, average for its configuration. The 6-plus–hour battery life is longer than that of nearly every other notebook we've seen.

CTX

We liked many of the CTX's design details. The protective port door has a hinge in the middle so it doesn't bend like many we've seen. Raised bumpers on the notebook cover look a little funny, but CTX says they help protect the screen from direct pressure should you stack something on top of the unit. Our main design peeves include a mushy, unresponsive keyboard and a brightness control hidden on the side of the cover. We were also disappointed by the system manual.

CTX bundles Microsoft Works, Money, and Encarta 96. You get a two-year warranty on parts and labor and nonstop phone support.

TEST REPORT Battery Life



* Best Buy

Time in hours:minutes.

Methodology
We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows 95 applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Desktop Snapshots

These systems were tested along with the others but didn't score high enough to reach the Top 20 charts.

AST Bravo LC 5166

PROS: Nice software, 6X CD-ROM drive, built-in sound chip

CONS: Newfangled memory setup slows performance

The $2330 Bravo LC 5166 is the first PC we've tested with universal memory architecture, which allows part of the Bravo's 16MB of main RAM to be used as graphics memory. Performance is slow—the Bravo Pentium-166 runs more like a Pentium-100. But AST also builds in some nice features, like a ROM-based antivirus program, and remote diagnostics software so technical support can troubleshoot your PC over phone lines. *AST Computer, 800/876-4278* **Reader service no. 714**

DTK Quin-55M/P166

PROS: Fast, lots of room for expansion, good graphics card

CONS: Short support hours, no weekend support

This roomy $3310 tower is one of the fastest P-166 systems we've tested, and it comes with 16MB of RAM and a 1280MB hard drive. The multimedia components, including a Number Nine Imagine 128 graphics boards and a 6X CD-ROM drive, are also attractive. This DTK is nearly a Top 20 power desktop, but weak support policies hold it back. *DTK Computer, 800/289-2385* **Reader service no. 716**

First Computer FCS P5-100,-120,-133

PROS: Inexpensive; roomy; good keyboard

CONS: One-year parts warranty

These three budget PCs have the same design, down to their roomy interior and a responsive Windows 95 keyboard. The $2099 P5-120, outfitted with 16MB of RAM, a 6X CD-ROM drive, and a Matrox Millennium graphics card, is the best value of the three. The P5-133 is similarly configured but costs $200 more, while the $1999 P5-100 is slow. *First Computer Systems, 800/325-1911* **Reader service no. 717**

First Computer FCS P5-166

PROS: Inexpensive, roomy, good keyboard

CONS: One-year parts warranty

The New Casio Digital Camera.
Pretty amazing...no matter how you look at it.

The new Casio QV-10A *plus* Digital Camera might just change the way you take and display your pictures. Because until now, digital cameras were bulky and expensive. The QV-10A *plus* is anything but.

Using it is simple. With its LCD screen you see your pictures instantly. With the touch of a button you can delete images you don't want or display one, four or nine shots at a time in the camera or on a TV. It can even send images from the computer back to the camera, so it's perfect for presentations.

And with the QV software, you can easily add photos to documents and e-mail. Plus with the Adobe PhotoDeluxe™ software that's included, you can even customize your photos. Now it doesn't take a PhD to use a digital camera. All it takes is the Casio QV-10A *plus*.

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The $3099 FCS P5-166 is an attractive value. It's fast, with a PC WorldBench score of 198, and comes with 16MB of RAM, a 2GB hard drive, a Matrox Millennium graphics card, a 17-inch monitor, and a 6X CD-ROM drive. But a short warranty and an unknown track record for system reliability and service keep this PC off the chart. *First Computer Systems, 800/325-1911* **Reader service no. 718**

Tatung TCS-5100

PROS: Well constructed; 6X CD-ROM drive; sound; speakers

CONS: Slow for a Pentium-166, limited support hours

This $2489 Pentium-166 desktop PC is very affordable. It comes with 16MB of RAM, a 1280MB hard drive, a 15-inch monitor, and a Diamond Stealth64 Video card with 2MB of VRAM, but it's slow for a P-166. Technical support is available during regular business hours but not on weekends. *Tatung Computer, 800/829-2850* **Reader service no. 719**

Notebook Snapshots

These systems were tested along with the others but didn't score high enough to reach the Top 20 charts.

Broadax NP8662T, NP8662D

PROS: Good performance, nice multimedia features

CONS: Low battery life, no track record for reliability or service

These two Pentium-120 notebooks differ primarily in the quality of their displays. The $3230 NP8662T has a 10.4-inch active-matrix display, the other costs $400 less and comes with an 11.3-inch dual-scan screen. Both systems have 16MB of RAM, 4X CD-ROM drives, and 16-bit stereo sound. The active-matrix model with a 1.3GB hard drive nearly makes the power notebooks chart, but it suffers from 2-hour battery life. *Broadax Systems, 800/872-4547* **Reader service no. 720**

Chembook 9800

PROS: Fast; rugged; big 1GB hard drive

CONS: Short battery life; heavy; limited support hours

The $3040 Chembook 9800 we tested came with 24MB of RAM. That extra memory explains its PC WorldBench score of 137, which is high for a Pentium-100 notebook. The Chembook, however, lasted just 2 hours on a charge. In addition, its 8.2-pound traveling weight is awfully hefty, considering that the notebook doesn't have a CD-ROM drive; and you can't get technical support after business hours or on weekends. *Chem USA, 800/866-2436* **Reader service no. 721**

IBM ThinkPad 365CS

PROS: Crisp dual-scan screen, responsive keyboard

CONS: Slow; expensive for what you get; not very upgradable

Overall, the $2599 ThinkPad 365CS meets the high design standards of other IBM notebooks, with a nice screen and a comfortable keyboard. But you don't get much power for your dollar. This notebook uses a

FEATURES COMPARISON This Month's Contenders—Desktops

● = Yes ○ = No

n/a = not applicable

	Dell Dimension XPS Pro200n	Dell OptiPlex GXM 5100
Standard features		
Street price as of 5/15/96 [1]	$3599	$2223
CPU	Pentium Pro-200	Pentium-100
ZIF/overdrive socket	●/○	●/○
BIOS manufacturer	AMI	Phoenix
Installed/maximum RAM (MB)	32/128	16/128
SIMM sockets/number free	4/2	4/2
Secondary RAM cache installed/maximum (K)	256/256 [2]	256/512
Case style	minitower	desktop
Free externally accessible 3½-inch/5¼-inch	2/1	0/1
Free internal 3½-inch/5¼-inch drive bays	1/0	0/0
Free 16-bit ISA expansion slots	3	3 [3]
Free 32-bit PCI expansion slots	3	2 [3]
Hard disk manufacturer	Seagate	Seagate
Size (MB)	2140	1083
Adapter	EIDE	EIDE
Graphics adapter	Imagine128 Series 2	integrated Trio64V+
Installed memory (MB)/type	4/VRAM	2/EDO DRAM
Monitor	Dell VS17X	Dell VS15X
Tube/viewable diagonal (inches)	17/15.6	15/13.6
Dot pitch (mm)	.28	.28
Modem speed for fax/data (kilobits per second)	n/a	n/a
Sound board	n/a	integrated Vibra 16
CD-ROM drive manufacturer	NEC	NEC
Speed	8X	4X
Parallel/serial/mouse/SCSI ports	1/2/1/0	1/2/1/0
Service and support		
Warranty for parts/labor (years)	3/3	3/3
30-day money-back guarantee	●	●
On-site service first-year price	free	free
Repair turnaround policy (days at service center)	2	2
Daily toll-free phone support (hours)	24	24
Weekend support	●	●
Online support sites	AOL, BBS, CIS, Prodigy, WWW	AOL, BBS, CIS, Prodigy, WWW
Automated fax support	●	●

BEST BUY

[1] All systems priced as configured with Windows 95, VGA and color monitor, keyboard, and mouse or other pointing device. Price is direct or based on vendor estimate.

slow Cyrix 4x86 processor running at 75 MHz and managed a PC WorldBench score of just 62. Most notebook systems in this performance range cost about $700 less. In addition, there's no secondary cache option, and the system can hold only 24MB of RAM. *IBM Personal Computer Co., 800/426-2968*

Micro Express NP8000-120

PROS: Fast, sturdy, inexpensive; built-in CD-ROM drive

CONS: Short battery life, poor screen quality

At $2399, the Micro Express NP8000-120 is a good deal. It comes with 16MB of RAM, 256K of secondary cache, and a 2X CD-ROM drive. The PC WorldBench score of 139 is average for a P-120 power notebook. However, the company stinted in some areas. We would like to see a larger hard drive than the 540MB unit supplied with the system; the notebook's 1.3-hour battery life is terrible; and the 10.4-inch dual-scan screen suffers from ghosts and shadows. *Micro Express, 800/989-9900*

Reader service no. 722

ptiPlex 5166	Dell OptiPlex GXpro 200	Micro Express MicroFlex-686/P120+	NEC PowerMate P166	NEC PowerMate V100	NEC Ready 9617	NMC PCW P100	Quantex QP5/166 SM-2	Quantex QP6/200 SM-2
$3877	$4676	$1399	$3257	$2445	$2448	$1749	$2949	$3549
ntium-166	Pentium Pro-200	Cx6x86-P120+	Pentium-166	Pentium-100	Pentium-133	Pentium-100	Pentium-166	Pentium Pro-200
●/○	●/○	●/○	●/○	●/○	●/○	●/○	●/○	●/●
Phoenix	Phoenix	Award	Phoenix	Phoenix	Phoenix	Award	AMI	AMI
16/128	32/512	16/128	16/128	16/128	16/128	16/128	32/128	32/128
4/2	4/3	6/4	4/2	4/2	4/2	4/2	4/2	4/0
512/512	256/256 [2]	256/512	256/512	256/256	256/256	256/512	512/512	256/256 [2]
ninitower	desktop	minitower	minitower	minitower	minitower	minitower	minitower	minitower
0/2	0/1	1/2	0/2	0/2	0/2	0/2	0/3	0/2
1/0	1/0	1/0	2/0	2/0	0/0	1/0	2/0	1/0
5 [4]	2 [3]	4 [4]	4 [4]	4 [4]	3 [4]	1	2	1 [4]
1 [4]	4 [3]	3 [4]	1 [4]	2 [4]	2 [4]	2	2	3 [4]
stem Digital	Seagate	Quantum	Seagate	Conner	Maxtor	Seagate	Western Digital	Western Digital
1624	2140	1280	2140	1621	1626	850	2560	2560
EIDE	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE	EIDE
agine128	Imagine128 Series 2	STB Powergraph 64 Video	Matrox MGA Millennium	Alliance ProMotion	integrated ProMotion	Vista A64P	Imagine128 Series 2	Stealth64 Video 3200
4/VRAM	4/VRAM	2/EDO DRAM	4/WRAM	2/DRAM	1/DRAM	2/DRAM	4/VRAM	2/VRAM
ell VS17X	Dell VS17X	GCV M1566L	NEC XV15+	NEC XV15+	NEC C500	CTX 1565D	MAG DX1795	MAG DX1795
17/15.6	17/15.6	15/14.1	15/13.5	15/13.5	15/13.8	15/13.8	17/16	17/16
.28	.28	.28	.28	.28	.28	.28	.26	.26
n/a	n/a	n/a	n/a	n/a	14.4/28.8	14.4/28.8	14.4/28.8	14.4/28.8
ntegrated Vibra 16	integrated Vibra 16	ESS ES1688	integrated OPTi Sound 930	integrated OPTi Sound 930	integrated OPTi Sound 930	Sound Blaster Vibra 16	Soundscape VIVO PnP	Soundscape VIVO PnP
NEC	NEC	Sony	Teac	Goldstar	NEC	NMC	Toshiba	Toshiba
4X	4X	4X	6X	6X	6X	4X	8X	6X
1/2/1/0	1/2/1/0	1/2/0/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/0/0	1/2/1/0	1/2/1/0
3/3	3/3	2/2	3/3	3/3	1/1	3/3	1/1	1/1
●	●	●	○	○	●	●	●	●
free	free	free	free	free	free	$39	free	free
2	2	2	4	4	2	2	1	1
24	24	24 [5]	24	24	24	10	15	15
●	●	●	●	●	●	○	●	●
L, BBS, CIS, odigy, WWW	AOL, BBS, CIS, Prodigy, WWW	WWW	AOL, BBS, CIS, MSN, WWW	AOL, BBS, CIS, MSN, WWW	AOL, BBS, CIS, MSN, WWW	BBS, WWW	BBS, Prodigy, WWW	BBS, Prodigy, WWW
●	●	●	●	●	●	●	●	●

ium Pro has 256K of secondary cache built in.

ess 16-bit slots available when all PCI slots are filled, and vice versa.

[4] One less 16-bit slot available when all PCI slots are filled, and vice versa.

[6] Requires callback after business hours.

This Month's Contenders

DESKTOPS

▼ PC WorldBench score		◀ FASTER — Application test times — SLOWER ▶
232	**Dell OptiPlex GXpro 200** Pentium Pro-200 (desktop)	
224	**Quantex QP6/200 SM-2** Pentium Pro-200 (minitower)	
211	**Dell Dimension XPSPro200n** Pentium Pro-200 (minitower)	
209	**Quantex QP5/166 SM-2** Pentium-166 (minitower)	
197	**Dell OptiPlex GXMT 5166** Pentium-166 (minitower)	
194	**NEC PowerMate P166** Pentium-166 (minitower)	
175	**Micro Express MicroFlex-686/P120+** Cyrix 6x86-P120+ (minitower)	
170	**Dell OptiPlex GXM 5100** Pentium-100 (desktop)	
168	**NMC PCW P100** Pentium-100 (minitower)	
163	**NEC PowerMate V100** Pentium-100 (minitower)	
152	**NEC Ready 9617** Pentium-133 (minitower)	

NOTEBOOKS

166	**Dell Latitude XPi P133ST** Pentium-133	
163	**Micron Millennia Transport P133** Pentium-133	
144	**DTK DTN-5A120C** Pentium-120	
91	**WinBook XP5 P75** Pentium-75	
84	**CTX EzBook 600CDT P75** Pentium-75	
75	**NEC Versa 550D** Cyrix 5x86-100	

Time in minutes 0 10 20 30 40 50 60 70 80

Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from six tests.

Methodology We tested each system as supplied by the manufacturer. All tests are performed under Windows 95 configured with an HP LaserJet IV as the default printer. We disable any power-saving features. We set the video resolution to 800 by 600 in 256 colors, using the supplied video driver where possible. We load the test applications and files and the test automation software and scripts.

Word 7.0 for Windows 95 (25 percent of weighting)
We open multiple documents, format text, copy and paste, close files, scroll, and save files. We also change document views, insert text, check spelling, repaginate, count words, print preview, and mail merge.

Excel 7.0 for Windows 95 (20 percent)
Using a variety of worksheets including an automobile statistics sheet, a multisheet federal income tax workbook, a variable-rate mortgage worksheet, and an analysis of life insurance policies, we perform common functions and tasks including opening a file, formatting, data entry, sorting, recalculation, data query, print preview, printing, and saving the file.

Picture Publisher 6.0 for Windows 95 (15 percent)
Using an assortment of graphics, we perform functions including opening and saving files, zooming, scrolling, palette changes, posterization, image masking, hue shifting, feathering, and copying and pasting.

Paradox 5.0 for Windows (15 percent)
We simulate an order entry system. We import tables and post a series of orders, looking up customer and product data in the process. We perform a variety of queries, edit data, and create reports.

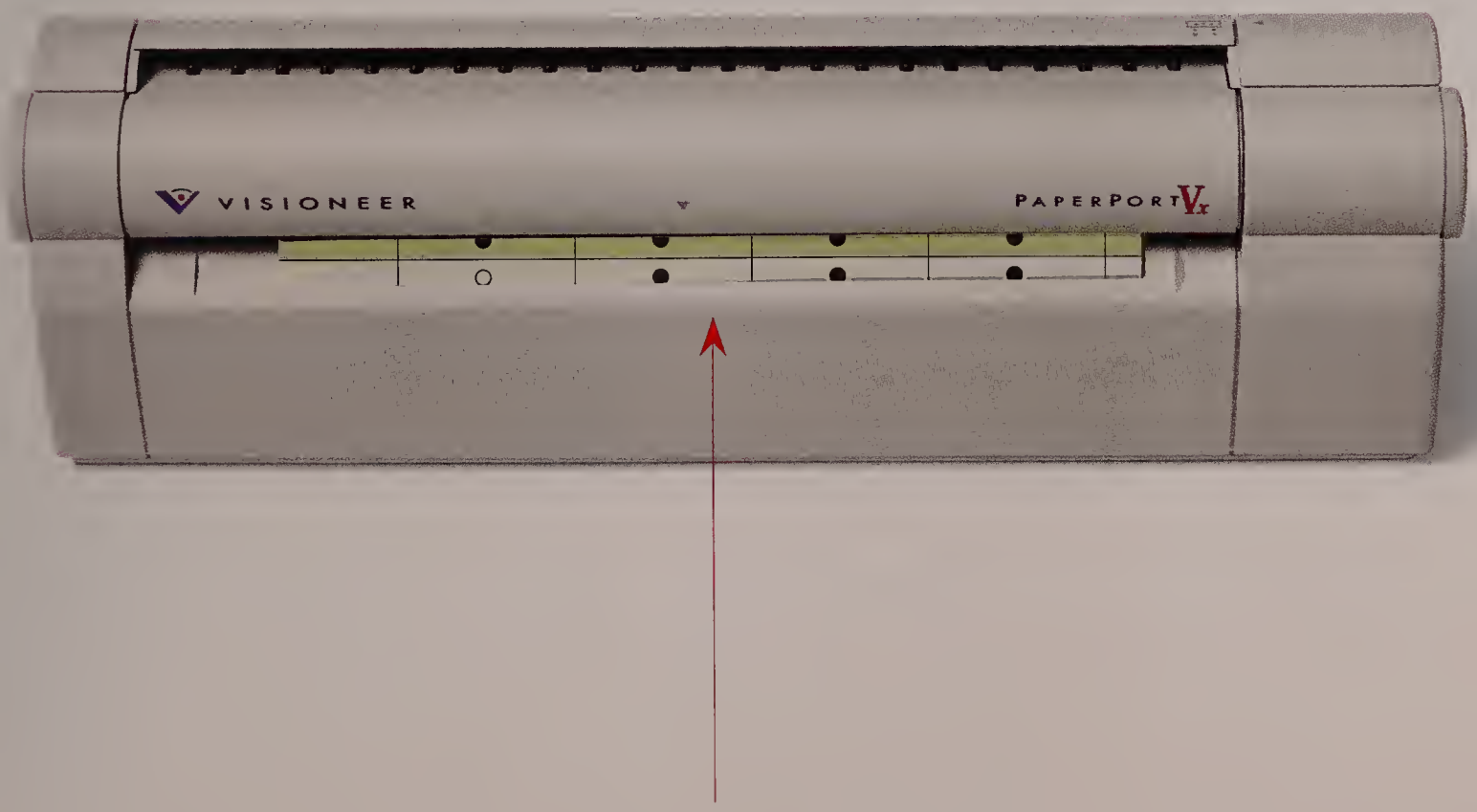
WordPerfect 6.1 for Windows (15 percent)
We open different-size files, search for text, change fonts, enter text, save files, and jump to a particular page. We also check spelling, copy and paste, scroll, change document views, and insert one file into another.

1-2-3 release 5 for Windows (10 percent)
Same functions as the Excel test.

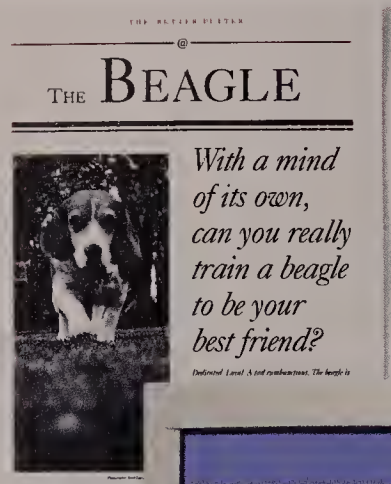
Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

BEST BUY

Go ahead, feed it.



TO SEE HOW VERSATILE OUR PAPERPORT Vx IS, JUST FEED IT A PIECE OF PAPER.



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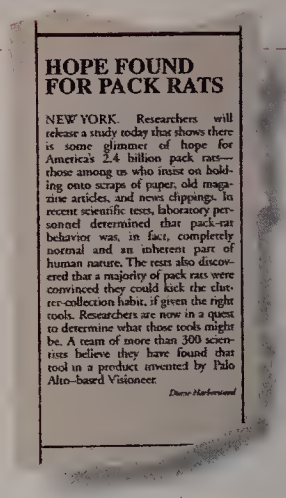

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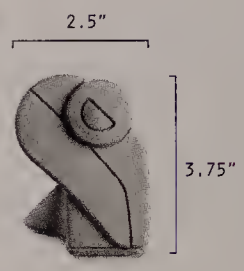

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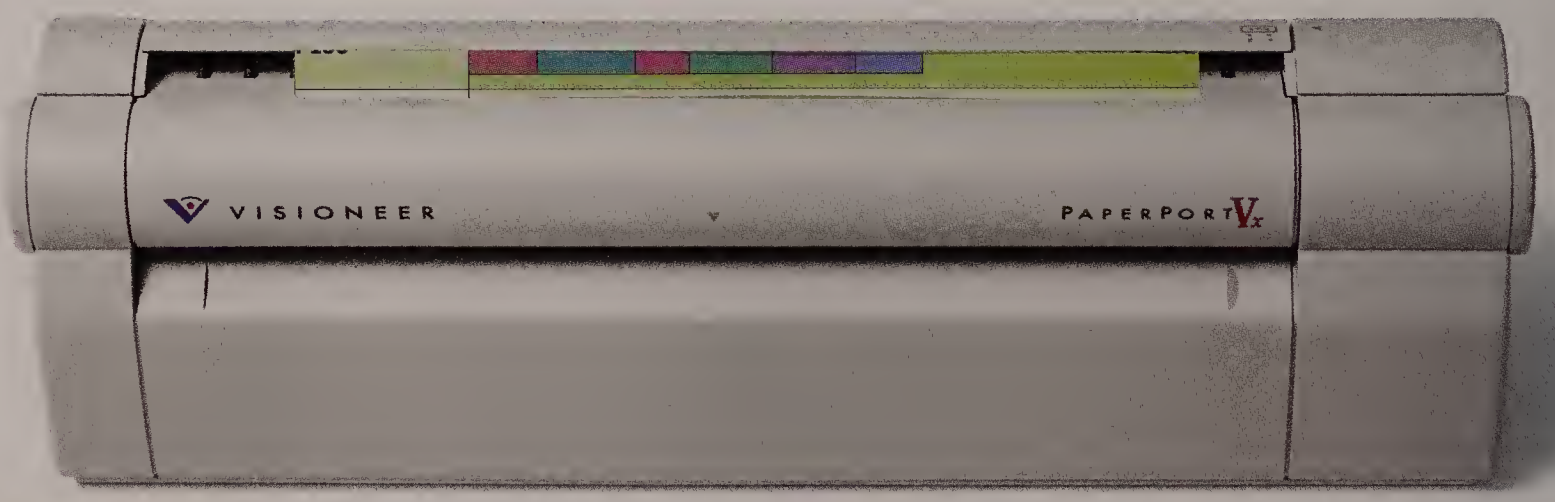

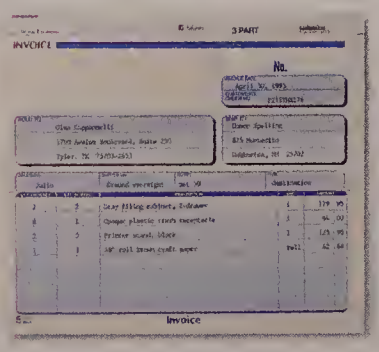

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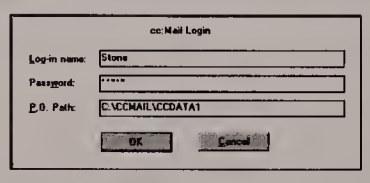

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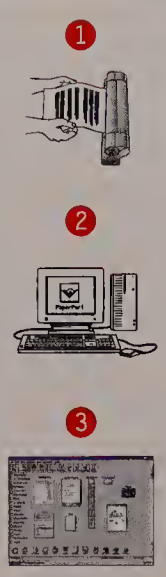

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VISIONEER

Twinhead Slimnote 8120TV

PROS: Sturdy design, good display, 2X CD-ROM drive

CONS: Short battery life, near–10-pound traveling weight

This $4695 notebook almost makes our power chart, thanks in part to a 149 score in our PC WorldBench test suite. The Twinhead Slimnote 8120TV comes with 16MB of RAM, a spacious 1.3GB hard drive, a 2X CD-ROM drive, and stereo sound. We especially liked its 11.3-inch active-matrix, super-VGA display. About all that holds this system back is the short 2-hour battery life—especially disappointing considering Twinhead's lithium ion battery—and its relatively large bulk. The standard warranty is one year, but you can extend it to three years for $385. *Twinhead, 800/995-8946* **Reader service no. 723**

FEATURES COMPARISON This Month's Contenders–Notebooks

● = Yes ○ = No

n/a = not applicable

Standard features	CTX EzBook 600CDT P75	Dell Latitude XPi P133ST	DTK DTN-5A120C	Micron Millennia Transport P133	NEC Versa 550D	WinBook XP5 P75
Street price as of 5/15/96 [1]	$2399	$5099	$3695	$4998	$1799	$1999
CPU	Pentium-75	Pentium-133	Pentium-120	Pentium-133	Cyrix 5x86-100	Pentium-75
Traveling weight (pounds) [2]	9.2	7.2	9.4	9	7.4	7.4
Width x depth x height (inches)	11.3 x 8.7 x 2.3	10.9 x 8.5 x 2	11.7 x 9.3 x 2.3	11.6 x 9.3 x 2	11.3 x 8.9 x 2	11.5 x 8.9 x 2.1
Installed/maximum RAM (MB)	8/32	24/40	16/40	16/48	8/24	8/32
Secondary RAM cache installed/max. (K)	256/256	256/256	256/256	256/256	0/0	256/256
Installed/maximum hard disk (MB)	540/810	1215/1215	810/810	1215/1215	540/540	540/810
Removable hard disk	●	●	●	●	●	●
Screen type	color active	color active	color active	color active	color dual-scan	color dual-scan
Viewable screen diagonal (inches)	10.4	11.3	10.4	11.3	10.4	10.4
Highest resolution of LCD	640 x 480	800 x 600	800 x 600	800 x 600	640 x 480	640 x 480
Maximum screen colors	65,536	256	256	65,536	256	256
Simultaneous LCD and external monitor	●	●	●	●	●	●
Mouse/keyboard ports	○/●	●/● [3]	●/● [3]	●/○	●/● [3]	●/● [3]
Dedicated page-control keys	●	●	●	●	●	●
All 12 function keys dedicated	○	●	●	●	●	●
Standard <Ctrl> and <Alt> layout	●	○	○	●	○	○
Built-in pointing device	eraserhead	trackball	touchpad	eraserhead, touchpad	trackball	eraserhead
CD-ROM drive speed	2X	n/a	4X	4X	n/a	n/a
Built-in sound	●	●	●	●	○	○
Modem speed for fax/data (kbps)	n/a	n/a	14.4/28.8	14.4/28.8	n/a	14.4/14.4
PC Card slot Type II/III	2/1 [4]	2/1 [4]	2/1 [4]	2/1 [4]	2/1 [4]	2/1 [4]
Power management						
Type of battery	NiMH	lithium ion	NiMH	lithium ion	NiMH	lithium ion
Suspend button	●	●	●	●	●	●
Suspends when case closed	●	○	○	●	●	○
Service and support						
Warranty for parts/labor (years)	2/2	3/3	2/2	5 [5]/1	1/1	1/1
30-day money-back guarantee	●	●	○	●	○	●
On-site/replacement service first year price	n/a	free	$50	n/a	free	n/a
Repair turnaround policy (days at service center)	3	2	3	3	1	○
Daily toll-free phone support (hours)	24	24	9	24	24	13
Weekend support	●	●	○	●	●	● [6]
Online support sites	BBS	AOL, BBS, CIS, Prodigy, WWW	WWW	CIS, WWW	AOL, BBS, CIS	BBS

BEST BUY

[1] All notebooks priced as configured with Windows 95, color display, and mouse or other pointing device. Price is direct or based on vendor estimate.

[2] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one.

[3] Mouse port doubles as keyboard port.

[4] Type III slot alternatively accepts two Type II devices.

[5] Five years on CPU and memory, three years on other hardware.

[7] Saturdays only.

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RELIABILITY AND SERVICE MONITOR

Win a Dell Dimension XPS P133c

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Dell Dimension XPS P133c, a Best Buy Pentium-133 PC in this month's Top 20.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to *PC World*, Box 8-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by August 31.
PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.
HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ AST ○ AT&T (NCR) ○ Austin (IPC) ○ Axik ○ Blackship ○ Canon ○ Compaq ○ Compudyne
○ Computrend ○ Comtrade ○ CTX ○ Dell ○ Diamond ○ Digital (DEC) ○ DTK ○ EPS ○ Epson ○ Everex ○ Future Tech ○ Gateway 2000
○ Hewlett-Packard ○ HiQ ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS ○ Nat'l Micro
○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ PerComp ○ Pionex ○ Polywell ○ Quantex ○ Robotech ○ Samsung ○ Sharp ○ Swan
○ Tangent ○ Texas Instruments ○ Toshiba ○ Twinhead ○ USA Flex ○ Vektron ○ VTech (Expotech, Laser) ○ WinBook ○ Zenith (ZDS) ○ Zenon ○ Zeos ○ Other

What size is this PC?
○ Desktop ○ Notebook/laptop ○ Handheld

What is the CPU?
○ PowerPC ○ Pentium ○ 80486 ○ 80386 ○ Other

Where did you buy this PC?
○ Local dealer ○ Mail/phone order ○ Direct from field sales force ○ Membership discount store ○ Computer superstore ○ Home electronics store ○ Retail store ○ Value-added reseller ○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week ○ 1–2 weeks ○ 3–4 weeks ○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR ○ Staff computer technician ○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

How long was this after you purchased your PC?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer ○ Dealer/store where purchased ○ Manufacturer's authorized repair technician ○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1–2 minutes ○ 3–5 minutes ○ 6–10 minutes ○ 11–20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes–1 hour ○ 2–5 hours ○ 6–10 hours ○ 11–24 hours ○ 1½–2 days ○ 3–5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ 3–7 days ○ 8–14 days ○ 15–30 days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was the problem resolved to your satisfaction?
○ Yes ○ No

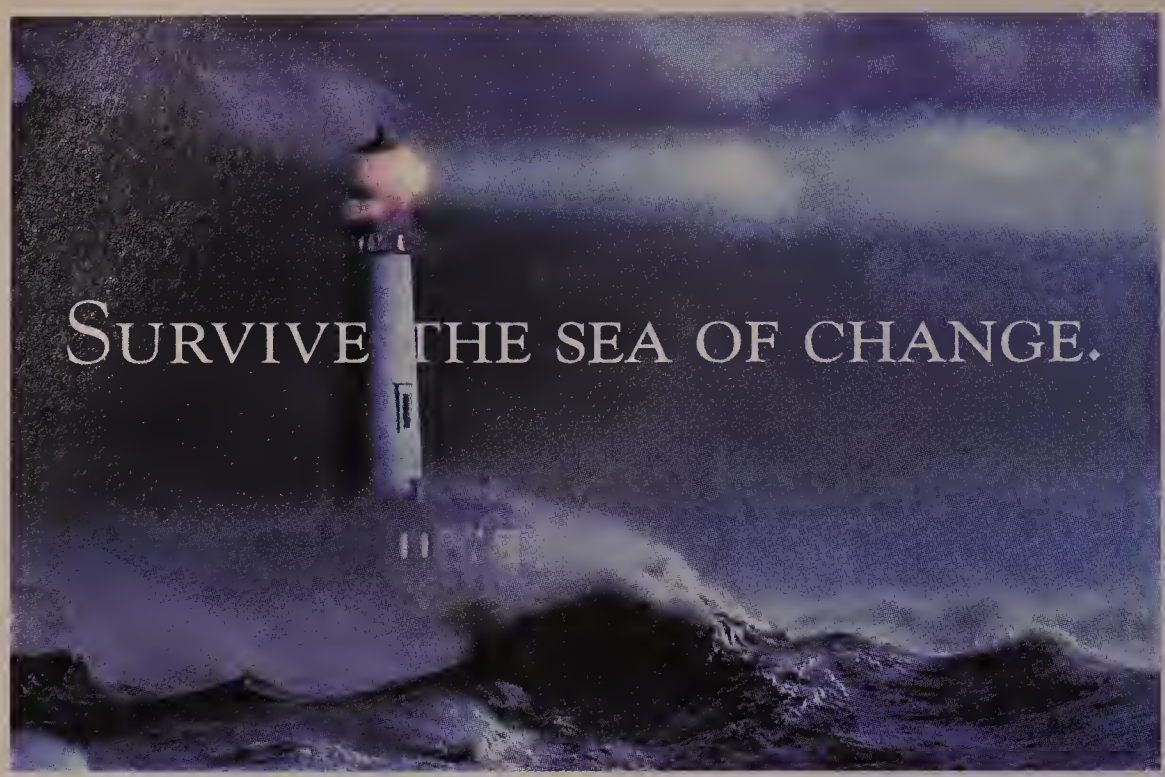
How would you rate the person(s) who helped you?

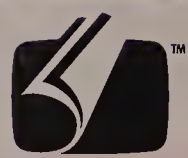
	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

PLEASE FAX TO 415/357-4522. FOR BEST RESULTS, PHOTOCOPY THIS PAGE.





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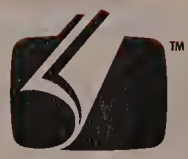

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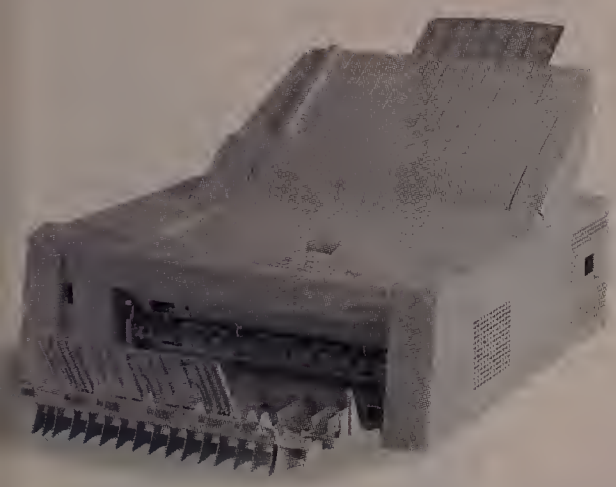
New NEC Laser Pairs High Quality With High Speed



Beauty More Than Skin-Deep
NEC's SuperScript 860 is fast and packed with features. However, its fold-out, face-down secondary output tray is rather unsightly.

How much does a 600-dpi, 8-ppm laser cost? With the debut of the NEC SuperScript 860, not as much as you'd think: Its $499 price is affordable compared to similar models; other contenders on our monochrome chart cost less but offer less. The NEC is fast, and its new driver lets you print more ways than any other personal laser we've seen. It ranks fourth on the list. The SuperScript 660, its older sibling, falls to fifth now that we've corrected some misinformation about paper handling and front panel controls.

We also reviewed four printers that didn't make the Top 10 chart: the Lexmark Optra E laser and three Okidata models—the OL810e/PS and OL-610e/PS LED printers, and the Okijet 2010 ink jet.

On our color chart, the Epson Stylus Color II now shares Best Buy honors with HP's DeskJet 820Cse. The street price for the Epson has plunged from $399 to $320, making this printer an excellent alternative to the $389 HP. The DeskJet is easier to use and produces better-quality output on plain paper, but the Stylus Color II is faster and renders color photographs with more fidelity (as long as you use Epson's pricey coated paper).

PrintGear Makes Its Mark

The NEC SuperScript 860 is the first printer to use PrintGear, a new image technology from Adobe that combines a special processor inside the printer with a feature-packed driver designed jointly with NEC. This processor helped the 600-dpi SuperScript 860 tie with the 300-dpi Panasonic KX-P6100 as the

TOP 10 PERSONAL PRINTERS

	Last ranking	Last reviewed	Type	Street price	Overall rating	Print quality: Monochrome	Print quality: Color	Speed rating: Monochrome	Speed rating: Color	Features, ease-of-use rating	Reader service number	Comments
MONOCHROME												
1 Panasonic KX-P6100 800/742-8086	1	Apr 96	laser	$399	92	85	–	90	–	76	621	Fast, terrific print quality, but limited paper handling.
2 HP LaserJet 5L 800/752-0900	3	Apr 96	laser	$479	87	88	–	80	–	83	622	Excellent print quality, but the slowest laser we've tested.
3 Panasonic KX-P6500 800/742-8086	4	Apr 96	laser	$449	86	85	–	84	–	79	623	Terrific print quality, space-efficient tower design.
4 NEC SuperScript 860 800/632-4636	–	current	laser	$499	86	87	–	90	–	79	624	Fast and versatile, but the output trays are annoying.
5 NEC SuperScript 660 800/632-4636	2	Apr 96	laser	$399	85	84	–	83	–	73	625	All-around good printer produces mediocre gray scale.
COLOR												
1 HP DeskJet 820Cse 800/752-0900	1	June 96	ink jet	$389	91	77	90	76	82	88	626	Better plain-paper print quality than the Epson, but slower.
2 Epson Stylus Color II 800/289-3776 ext. 3000	2	Apr 96	ink jet	$320	91	73	80	84	90	85	–	Fastest color unit prints well, and price continues to drop.
3 HP DeskJet 680C 800/752-0900	3	June 96	ink jet	$309	84	75	80	84	83	86	627	Very good print quality and performance, economical price.
4 Canon BJC-4100 800/848-4123	4	Apr 96	ink jet	$329	79	68	74	84	81	86	628	Canon Creative software prints cards and T-shirt transfers.
5 Canon BJC-610 800/848-4123	5	Apr 96	ink jet	$469	76	77	85	54	56	86	629	Very slow; excellent print quality, Canon Creative software.

BEST BUY

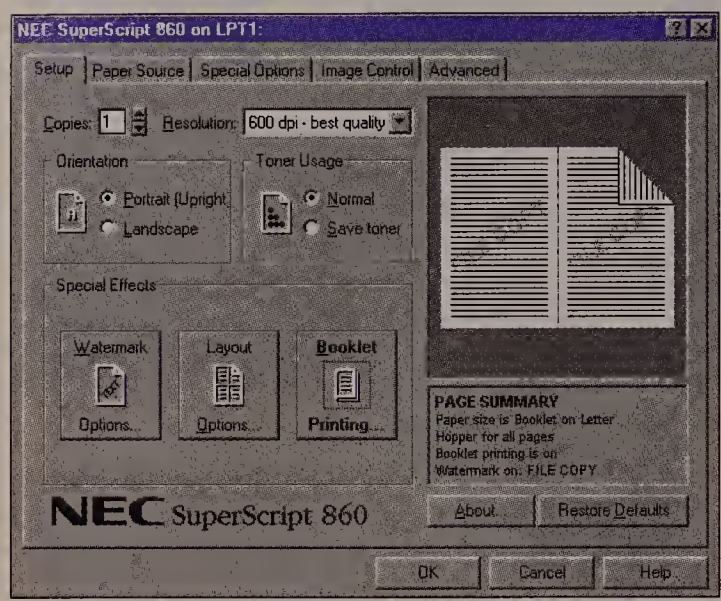
Methodology The overall rating includes ratings for print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 903.

fastest on the chart, despite the NEC's higher resolution. The NEC's versatile driver can do manual two-sided printing, squeeze multiple pages onto a single sheet of paper, create booklets and posters, and more.

The SuperScript 860 didn't place higher on the chart because at $499, it's the most expensive of the group. Printing capabilities aside, the actual print quality is no different from that of older NEC lasers: great text but somewhat grainy gray scale.

The NEC's face-up output tray causes multipage documents to stack up in the wrong order. Ironically, you must select an option called reverse order to print documents in the right order. You can also avoid misordered pages by unfolding the secondary output tray, whose pages emerge face down so that numerical order isn't a problem. However, it's an ungainly thing that increases the printer's already large footprint and makes it look like a dragon in need of dental work.



NEC's Talented Software *The SuperScript 860's capable driver lets you emblazon pages with a customized watermark, print double-sided sheets, and create booklets and posters.*

New Lexmark Laser Needs an Upgrade

Lexmark's Optra E is a toaster oven–size laser with good paper handling, speed, and print quality. But with only 1MB of RAM standard, the Optra E is one of the few printers we've encountered that had trouble printing our more complex graphics. When we installed a 4MB memory upgrade, the problems went away—but the printer's street price jumped from about $594 to a steep $831. The Optra E's toner cartridge and imaging drum were a challenge to install.

The OL610e/PS and OL810e/PS are the first of Okidata's LED printers to ship with Windows 95 drivers. LED printers produce pages with the speed and quality of a laser. But the Okidatas' high prices and clumsy control panels kept them off the chart.

Both Okidata models come with the PostScript printing language, which unfortunately increases their prices. At $749, the 300-dpi OL610e/PS uses smoothing techniques to produce text and gray-scale graphics rivaling the output of most 600-dpi printers. For $1139, the OL810e/PS provides true 600-dpi print quality, faster performance, a generous 250-sheet input tray, and Macintosh and serial ports.

But in their default settings, both Okidata units produce excessively dark pages. We got better results when we tinkered with the darkness setting—something that can be done only by using the cumbersome push-button menus on the front control panels.

Okidata's $369 Okijet 2010 ink jet printer almost earned a spot on the color chart. Like the Lexmark WinWriter 150c it closely resembles, the Okijet features unusually good paper handling for an ink jet, with a large input tray and a manual slot that can take letterhead stationery or an envelope. The Okijet's print quality is satisfactory, but the ink has a dull look compared to the vivid colors and rich blacks produced by HP's DeskJet 820Cse and 680C.

—Harry McCracken

Harry McCracken is a senior associate editor for PC World. *Testing performed by Ulrike Diehlmann and Dave Casini of the PC World Test Center.*

PRINT QUALITY SAMPLES New NEC Laser Prints Great Text, Less-Impressive Gray Scale

Panasonic KX-P6100

The only 300-dpi laser on our chart, Panasonic's KX-P6100 uses smoothing techniques to rival 600-dpi print quality.

NEC SuperScript 860

NEC's SuperScript 860 does a fine job with text, but as with many other low-cost 600-dpi lasers, its gray-scale output is often grainy.

HP DeskJet 820Cse

HP's DeskJet 820Cse remains one of the few ink jets that can produce laserlike text as well as bright color images on inexpensive paper.

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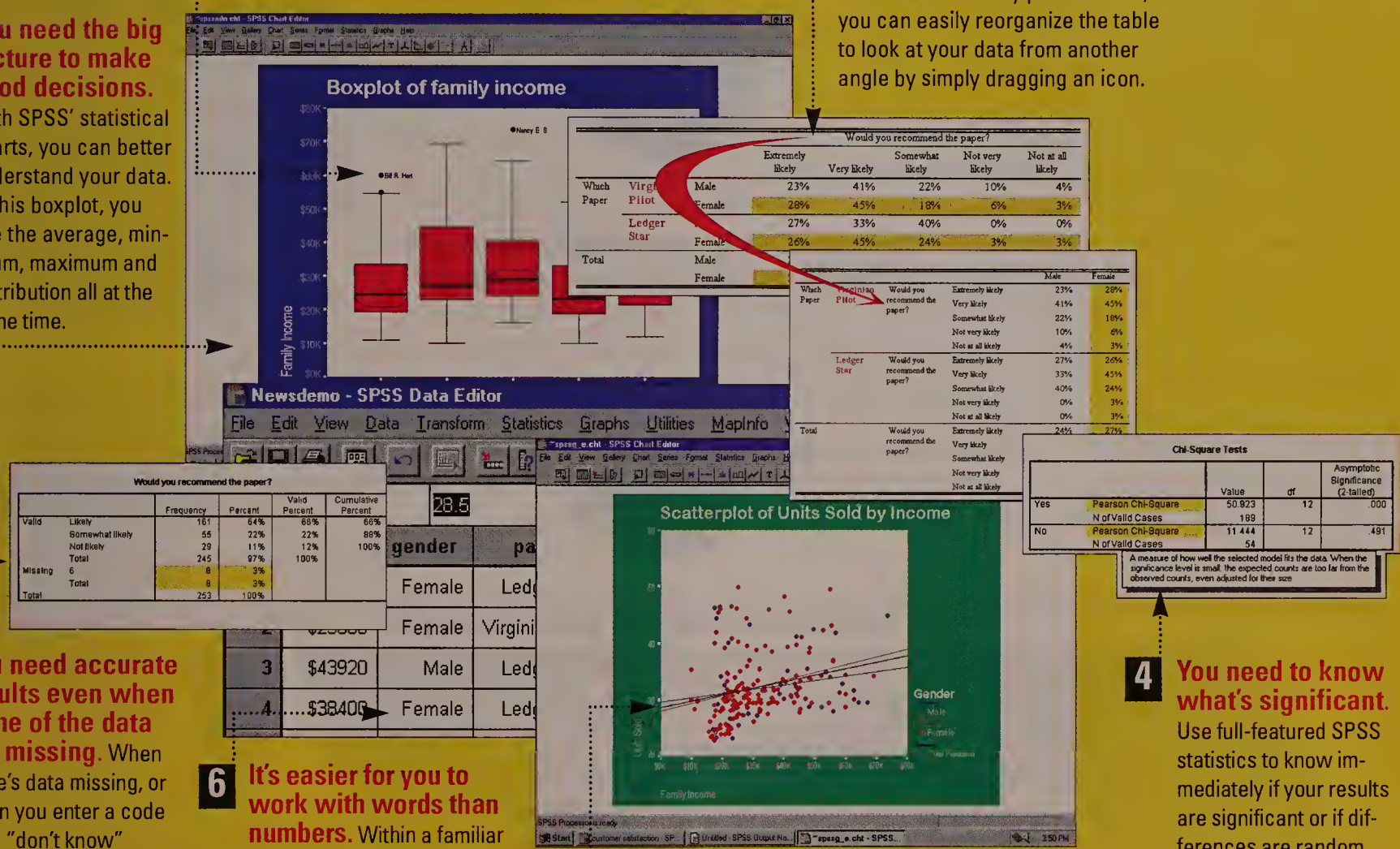

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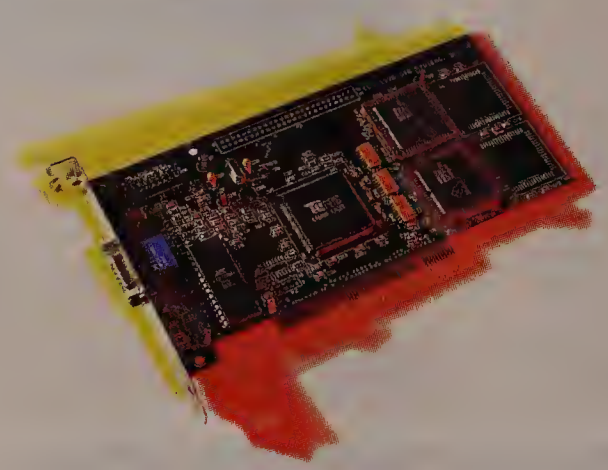

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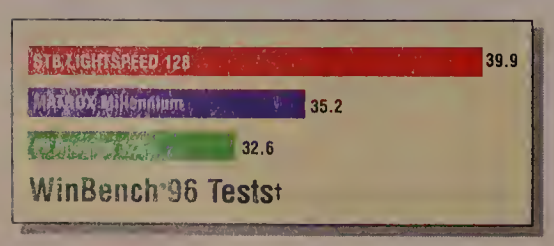

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MultiSync M500: Bright Lights, Big Disappointment

Pleasing to the Eye
A modest price, vivid color graphics quality, and an extensive set of advanced controls land the MAG InnoVision DX15T in fourth place.

Sometimes even the best ideas fade in the light of day—or under fluorescent office lights. NEC's sleek new MultiSync M500 looked good last April (see "Completely Focused: NEC's New MultiSyncs"). The M500's groundbreaking CromaClear tube displayed images as vibrant and detailed as any Trinitron-based monitor. But when we moved the M500 out of a dim cubicle and under the fluorescent fixtures of our lab, contrast dulled and colors blanched. The culprit? Poor antiglare coating. To make matters worse, controls for contrast and brightness are buried four and five button pushes deep into the monitor's on-screen menu. This problem and the M500's high price ($599) keep it off our Top 10 chart, despite its built-in speakers and microphone, and plain-English on-screen menus.

Of the eight monitors we tested this month, only MAG's $419 InnoVision DX15T made our list—in fourth place. It displays text that's crisp and easy to read. Compared to the NEC, the dark tint of the DX15T's flat Trinitron tube is better at reducing screen glare, so our color test image of fruit looked far more vivid. Simple dials for contrast and brightness make the DX15T easy to adjust when lighting conditions change. A tap on the control panel cover reveals four buttons that let you navigate quickly through an on-screen menu of advanced settings.

Mediocre display quality is why the other monitors tested this month didn't make the Top 10. The $549 Nokia Multigraph 449X, the $499 Panasonic PanaSync Pro P15, and the $460 Sony MultiScan 15sx are also high priced. The $399 NEC MultiSync C500, the $349 Samsung SyncMaster 4Ne and the $369 ViewSonic 15ES are affordable, but lack sharp detail.

—John Goddard

TOP 10
15-INCH MONITORS

	Last ranking	First reviewed	Street price	Overall rating	Text quality rating	Graphics quality rating	Features, ease-of-use rating	Viewable screen diagonal (inches)	Max. refresh rate at 800 x 600 (Hz)	Reader service number	Comments
1 **Mitsubishi Diamond Scan 15HX** 800/843-2515	1	June 96	$424	84	75	73	77	13.75	90	630	Very good display, Level 2b Plug and Play, [1] extensive on-screen menu; awkward buttons.
2 **NEC MultiSync XV15+** 800/632-4636	2	June 96	$479	82	78	81	70	13.4	76	631	Best graphics, very detailed text, Level 2b PnP, adequate refresh, easy dials; pricey.
3 **ArtMedia TX1664** 800/278-6334	3	June 96	$468	82	72	77	77	13.75	85	632	Very good graphics and text, Level 2b PnP, intuitive controls; faint line across screen.
4 **MAG InnoVision DX15T** 800/827-3998	—	current	$419	82	71	75	77	13.85	85	633	Low price, very good graphics, Level 2b PnP; frequent button-pushing through menus.
5 **Smile CA1516SL** 800/876-4532	4	June 96	$370	81	71	70	63	13.75	90	634	Lowest price, above-average display, Level 2b PnP; confusing on-screen menu.
6 **Panasonic PanaMedia 15** 800/742-8086	5	June 96	$499	80	73	62	85	14	107	635	Very good text, Level 2b PnP, speakers and mike, easy menu controls; pricey.
7 **ViewSonic 15GA** 800/888-8583	6	Oct 95	$499	80	72	62	85	14	108	636	Very good text detail, speakers and mike, Level 2b PnP; expensive despite price drop.
8 **Dell UltraScan 15TX** 800/289-3355	10	Feb 96	$424	79	71	71	70	13.85	75	637	$35 price drop, above-average display, Level 2b PnP; faint line across screen.
9 **Samsung SyncMaster 15GLI** 800/726-7864	8	Oct 95	$408	79	65	66	70	13.36	100	638	Low price, average display quality, fast refresh; small 13.4-inch viewing area.
10 **Sony MultiScan 15sfII** 800/352-7669	9	Apr 96	$529	79	72	76	74	13.85	90	639	Very good display, Level 2b PnP, easy on-screen menu; faint line across screen, pricey.

[1] Level 1 Plug and Play sends monitor settings to the graphics card; Level 2b adds bidirectional capability between the graphics card and monitor.

BEST BUY

Methodology We tested the monitors at a resolution of 800 by 600, set at 65,536 colors and a vertical refresh rate of 72 Hz. We used a Pentium-90 PC with 16MB of RAM and a Diamond Stealth64 PCI graphics card with 2MB of DRAM. The overall rating includes ratings for price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), and service and support (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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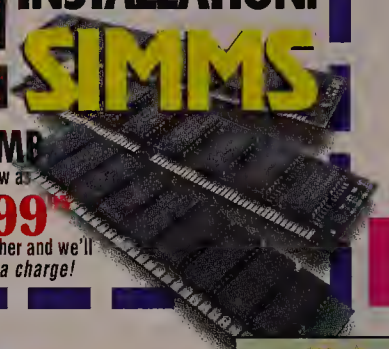

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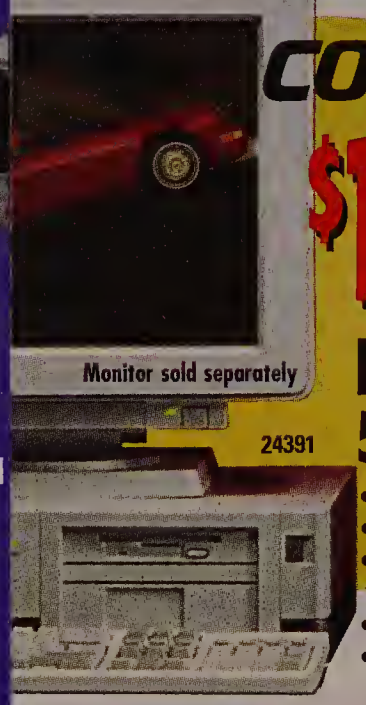

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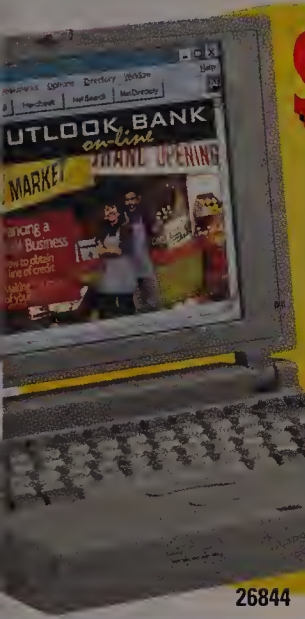

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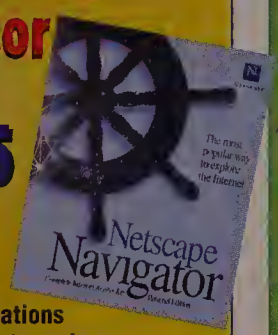

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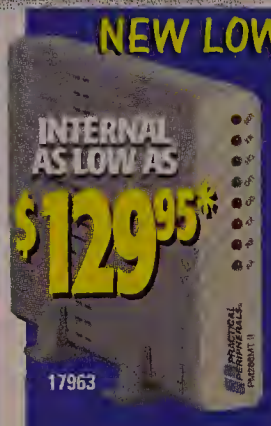

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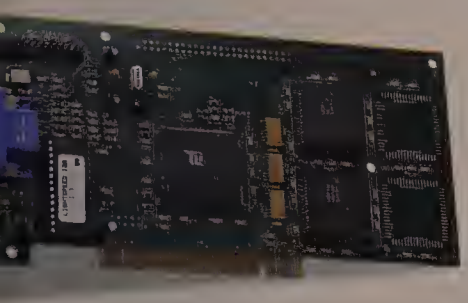
Circle 144 on reader service card

STB Lightspeed: First 128-Bit Board Under $300



Bandwidth for the Masses *Besides being fast and inexpensive, the STB Lightspeed 128 uses DirectVideo to give you great AVI video playback.*

Graphics boards with 128-bit controllers can move data faster than today's 64-bit cards. But until recently you had to pay hundreds of dollars extra for the added power. Now 128-bit boards are within reach, led by the $229 STB Lightspeed 128.

While a 128-bit card may be overkill if you use your PC only for word processing, it can definitely speed up complex graphics. The Lightspeed posted the highest PC WorldBench graphics score of any board we've tested. But to find out how much data it could really handle, we played multiple video clips simultaneously, and saw little degradation in video performance. The Lightspeed's performance is due partly to its use of Multibank DRAM, a new type of DRAM that lets data in and out more quickly than standard DRAM.

We also reviewed two other 128-bit boards, neither of which made the Top 10. Number Nine's $699 Imagine 128 Series 2 and Integrated Micro Solutions' $529 TwinTurbo-128P4 posted PC WorldBench graphics scores just behind the Lightspeed's, but their high prices relegate them to the PC workstation market. Nevertheless, the Imagine 128 Series 2 is an impressive board that includes 3-D acceleration and other leading-edge graphics technologies.

In addition, we retested the VRAM-based $309 Diamond Stealth64 Video 3240XL with a new version of its GT Display Drivers. While the first drivers hurt the board's performance, the latest drivers improved its speed by almost 20 percent. Meanwhile, Diamond has discontinued the Stealth64 Video 2201XL, replacing it with a cheaper 2201 version.

—Brad Grimes

TOP 10 GRAPHICS BOARDS

	Last ranking	Last reviewed	Street price	Overall rating	PC WorldBench graphics score	AVI playback (frames per second)	MPEG video playback quality	Chip/installed RAM (MB)/type	Reader service number	Comments
1 STB Lightspeed 128, 888/234-8750	–	current	$229	92	186	30	excellent	Tseng ET6000/ 2.25/MDRAM	601	Fastest board so far; great for desktop publishing and image editing.
2 Matrox MGA Millennium, 800/361-1408	1	June 96	$269	91	184	29	poor	MGA-2064W/ 2/WRAM	602	Fast Win 95 performance; 3-D acceleration; DirectVideo support.
3 STB Powergraph 64 Video, 888/234-8750	2	June 96	$179	88	175	10	good	S3 Trio64V+/ 2/EDO DRAM	603	$30 price drop; handles video well without DirectVideo; good support.
4 Hercules Terminator 64/Video, 800/532-0600	4	June 96	$179	86	172	8	good	S3 Trio64V+/ 2/EDO DRAM	604	Inexpensive; extensive utilities; performance is fine for business applications.
5 Diamond Stealth64 Video 2201TV, 800/468-5846	6	July 96	$224	84	175	9	excellent	S3 Trio64V+/ 2/EDO DRAM	605	Watch TV on your PC without hurting graphics; $45 price drop.
6 Hercules Terminator Professional, 800/532-0600	5	June 96	$279	84	178	10	good	S3 Vision968/ 2/VRAM	606	Good for graphics professionals, especially with an upgrade to 4MB.
7 Diamond Stealth64 Video 3240XL, 800/468-5846	–	current	$309	83	176	10	poor	S3 Vision968/ 2/VRAM	607	Fix for Win 95 driver spurs performance; intuitive utilities; expensive.
8 ATI Video Xpression, 905/882-2600 ext. 1	8	June 96	$179	83	174	8	excellent	ATI-264VT/ 2/DRAM	608	$20 price drop; slow at 1024 by 768; choppy AVI playback.
9 STB Velocity 64 Video, 888/234-8750	7	June 96	$279	82	176	10	good	S3 Vision968/ 2/VRAM	609	Much like the Terminator Pro; good Win 95 software; strong support.
10 Hercules Stingray 64/Video, 800/532-0600	9	June 96	$189	81	173	9	good	Ark2000PV/ 2/EDO DRAM	610	Inexpensive; highest refresh rate at 1024 by 768 is only 75 Hz.

BEST BUY

Methodolog We tested boards with PC WorldBench 1.0 at 800 by 600 resolution at 16.8 million colors (reported here) and at 1024 by 768 at 65,536 colors. For a description of the PC WorldBench tests, see the Test Report in this month's system review. We tested AVI video playback at 800 by 600 at 16.8 million colors using Microsoft's Media Player and an MCI command string that reports dropped frames. The clip was compressed at 320 by 240 at 16.8 million colors using Indeo 4.1. We played the clip at its native resolution and at twice its native resolution. We rated MPEG playback quality at 2X using the software player bundled with each board and compared quality to that of a hardware MPEG playback card. The overall rating includes ratings for performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Windows 95–certified Plug and Play.

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Circle 209 on reader service card

Latest Sportster Pushes Speed Limit to 33.6

Surf the Web in Overdrive
U.S. Robotics' latest revamp of the Sportster V.34 Faxmodem is the first 33.6-kbps modem we've seen to break the $200 barrier.

Modem manufacturers are slowly moving their products to the new top data speed of 33.6 kbps. This month we tested the new U.S. Robotics Sportster 28.8 V.34 Faxmodem, which comes with 33.6-kbps capability. The third-place Sportster doesn't have security features or voice mail, but it's Plug and Play and enticingly priced at $199.

Microcom recently admitted that its toll-free support isn't included; the DeskPorte 28.8P dropped to number two and the DeskPorte Fast V.34 fell off the chart. As a result, Motorola's ISG Lifestyle 28.8 becomes our sole desktop Best Buy. NewCom's 28800efx Data Fax Modem debuts on the chart with a great $139 price.

The other two external modems we looked at this month missed the chart. Diamond's SupraSonic 288V+ offers voice mail but only so-so speed. MultiTech's MultiModem ZDXb is the other 33.6 modem we tested this month—it's a hot performer, but its manual will leave most users cold.

Looking at the PC Cards, the Zoom/PCMCIA FaxModem V.34C is the only Best Buy. Microcom's TravelCard 28.8P shared the glory in July, but fell to fourth place this month once we learned that Microcom doesn't provide toll-free tech support. TDK added FlashROM upgradability to its DF2814 and took $40 off the price, nudging this PC Card modem into fifth place on the chart.

None of the three new PC Card modems we tested made the chart. Megahertz's XJEM3288T and Xircom's CreditCard Ethernet+Modem 28.8 both offer local area network connectivity—but both have low connect rates. MaxTech's PCM288 is a tepid performer and can't be upgraded by the user.

—Eric Hellweg and Bryan Hastings

TOP 10 MODEMS

		Last ranking	First reviewed	Street price external/internal (ISA)	Overall rating	Throughput rating	Connect rating	Features, ease-of-use rating	Reader service number	Comments
DESKTOP	1 Motorola ISG Lifestyle 28.8 800/566-3266	2	Mar 96	$215 / $175	89	85	97	69	611	Basic features, but nice price, toll-free support. Very high connect rate at 28.8 kbps.
DESKTOP	2 Microcom DeskPorte 28.8P 800/822-8224	1	Apr 96	$215 / —	87	78	90	79	612	Very good all-around modem. Serial port–only 28.8S model is a good alternative at $159.
DESKTOP	3 U.S. Robotics Sportster 28.8 V.34 Faxmodem 800/342-5877	—	current	$199 / —	86	79	89	77	613	New model has 33.6-kbps capability and is Plug and Play certified.
DESKTOP	4 Cardinal Technologies MVP288XV 800/775-0899	5	May 96	$185 / —	86	75	82	78	614	Performance is so-so, but you get voice mail, VoiceView, and cellular support.
DESKTOP	5 NewCom 28800efx Data Fax Modem 800/563-9266	—	current	$139 / —	86	75	90	69	615	Few features, but extremely affordable.
PC CARD	1 Zoom/PCMCIA FaxModem V.34C 800/631-3116	1	Mar 96	$199	88	74	90	77	616	Best price on the PC Card chart, and a very good performer.
PC CARD	2 Hayes Optima 288 V.34+Fax for PCMCIA With EZjack 770/840-9200	3	Feb 96	$269	87	79	72	79	617	Low connect rate at 28.8 kbps, but affordable. Detects calling-card tone.
PC CARD	3 Megahertz XJ4288 800/527-8677	4	Jul 96	$300	87	75	76	86	618	Has digital line voltage alert. First modem we've seen with both MNP10EC and ETC error control.
PC CARD	4 Microcom TravelCard 28.8P 800/822-8224	2	Feb 96	$259	86	77	80	78	619	Above-average performance, nice documentation, and is Plug and Play certified.
PC CARD	5 TDK Systems DF2814 800/999-4835	—	May 96	$240	86	77	89	69	620	Price drop of $40, FlashROM upgradability push it onto the chart. Excellent performer.

BEST BUY

Methodology We tested each modem using a pair of identical units, one at each end of a simulated public-service telephone network. We tested throughput and connect rates using a variety of file types and line conditions. We tested PC Card installation on a Latitude XPi P75D provided by Dell. We used vendor-supplied initialization strings. The more expensive a modem, the more importance we give price in the unit's overall rating. The overall rating includes ratings for price (3 to 20 percent), features and ease of use (32 to 38 percent), performance (40 to 46 percent), and support (8 to 13 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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A flood of new titles is headed for a store near you. Our preview lets you know what to expect.

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18 Soul Almighty: The Formative Years

28 **Q&A**
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BILL FRAMPTON

Attention Game Shoppers . . .

Trekkies will relish the details in Star Trek: The Next Generation—A Final Unity, with its elaborate 3-D rendering and the voices of seven key actors from the show.

If you've ever fallen into the hype-machine trap, plunking down $50 for a title that turned out to be junk, you're probably yet another jaded game consumer. Every year, a fresh batch of CD-ROM games hits stores in time for holiday shopping, and you have only a few weeks to learn the new game names and pick which ones to buy. Based on previews, demos, and our editors' inspection of wares at the E3 trade show (in Los Angeles in May), we take you on a tour of CD-ROMs slated for release between September and December 1996.

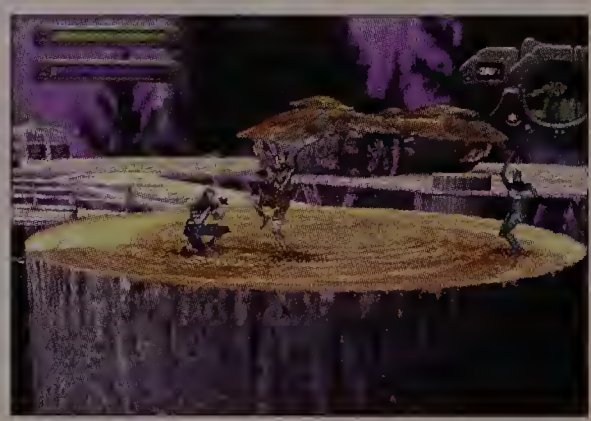
Name-Brand Quality

The megacompanies start showing off their megatitles early, using megamarketing budgets. Four stellar examples this year are Virgin's Z, Viacom's Aeon Flux, Activision's Hyperblade, and Take 2 Interactive's Battlecruiser 3000AD, all of which started piquing interest months ago. These companies must deliver phenomenal game play (even if that means delaying release) or face scathing online reviews from disappointed gamers. The result of all that pressure is four unique gaming experiences.

Z gives strategy simulations a crisp new look, thanks to superior graphics and a sophisticated AI (artificial intelligence) engine. In Z, your soldiers behave unpredictably, and your enemies can figure out what you're up to—and why.

Viacom's Aeon Flux just looks cool, combining real-time 3-D rendering of the popular animated, virtual wonder woman from MTV with strategy and the need for an itchy trigger finger. As Ms. Flux, you undertake six missions that involve battling robots, torturers, and wild animals; cloning yourself; and solving puzzles.

Hyperblade places you in a 3-D cyber rink, where you smoothly glide through a course resembling a hybrid jai alai/hockey arena, all in a multiplayer environment.



Take on multiple opponents in 3-D combat with Perfect Weapon.

Battlecruiser 3000AD—five years in the making—mixes elements of space sim, strategy, and resource management, in a 3-D world with a neural net–based AI system. Your goal: Defend the galaxy as commander of the space battleship/carrier/explorer (holding a crew of 75, four Interceptor fightercraft, and some massive weaponry) against imminent takeover.

The Underdog's Weapon

With fewer marketing dollars and less name recognition, smaller companies have to work overtime to produce a great game. But their efforts occasionally yield startling breakthroughs.

Look for American Softworks Corporation (ASC) to deliver some world-class innovation in its new lineup of titles. Most promising is Perfect Weapon, a 3-D Virtua Fighter–like game that applies AI in a multiplayer context without requiring a dedicated 3-D board. Rather than engaging in cool-but-limited one-on-one martial arts face-offs, you encounter up to five opponents at once. Their moves depend as much on what you do as on what their guys do. Somehow the title downplays blood and guts in favor of genuine martial arts strategy.

Trends and Takeoffs

Tired of playing male warriors duking it out in space? You'll see more 3-D women protagonists (in Viacom's Aeon Flux and Eidos's Tomb Raider); underwater adventures/sims (in Blue Byte's Archimedean Dynasty, Microsoft's Deadly Tide, and S.T.O.R.M. from ASC); sensationalism based on the unexplained (in Flagtower's The Unexplained, Inscape's Drowned God: The Genesis Conspiracy, and GTE Entertainment's Time Lapse Ancient Civilizations); as well as a predictable onslaught of titles based on television, film, and game hits (Ocean of America's Mission Impossible, Virgin's Blade-Runner, Simon & Schuster Interactive's Star Trek Borg, Microprose's Star Trek Generations, Inscape's Tales from the Crypt, LucasArts' X-Wing vs. Tie Fighter: A Star Wars Experience, Lucas-Arts' Jedi Knight: Dark Forces II, and Activision's prequel-packing-everything-you-asked-for-but-didn't-get-in-MechWarrior2: MechWarrior2: Mercenaries. Basically, if it sold in stores, on newsstands, in theaters, or on TV, it'll soon be ported to a game near you.

GTE Entertainment's Time Lapse Ancient Civilizations combines gorgeous images, video, and puzzles in four exotic worlds.

Shaky Rides

Some games get all the hype. But after an ocean of prerelease publicity, Id Software's Quake was disappointing. If you love Doom and you gobble up Doom clones, Quake makes a pleasant meal. But otherwise, it's the same game on a fancier plate—faster, somewhat prettier, and with several additional weapons. Meanwhile, the current king of twitch 'n' gore is FormGen's Duke Nukem 3D.

Lara Craft, heroine of Eidos's Tomb Raider, takes the wolfhounds out for a swim.

Powerhouse—the company responsible for the fantastic Jungle Book and the upcoming Pinocchio—hoped its adult-oriented movie game Collision would crash the big time; but the four-disc, full-motion video, arcade-style shooter appears to be large on production values and small on game play. It was still in preview mode when we sampled it: If Powerhouse adds some interactive elements at the last minute, Collision may achieve the pacing and diversity of tasks that it currently lacks.

No game can appeal to everyone. Different people love (or hate) shoot-'em-ups, puzzles, and sims. Very few gamers appreciate all three genres. The only guarantee we can give is that titles of all types are getting more realistic. As a result, whether you enjoy these advances via online communities, 3-D rendering, or good AI, you won't need to buy a Sega, Nintendo, or Sony console to play first-rate games this holiday season. —*James Oliver Cury*

Gaming Platforms: Today and Tomorrow

At an industry-wide level, two trends are obvious: Games are increasingly going Windows 95–native; and they will soon start to support Intel's MMX standard—a major enhancement to the Intel architecture that will help software developers deliver better multimedia. To get fast, great-looking 3-D multiplayer gaming, developers finally admit they're exploiting Windows 95 APIs and leaving old-school DOS in the dust. MMX will offer this better sound and graphics, but you'll have to wait until 1997 to start seeing these games.

The only titles that are already structured to take advantage of this core technology are Imagination Pilots' Eraser, Ubi Soft's POD, and Ocean's Dreadnought. However, most title developers are also looking into this new standard. Still, these games are a year away, so don't hold off buying that P-166 in the hopes of better gaming.

For online multiplayer games, look to AOL's beefed-up game presence, Sega's Saturn Net Link (a unique console option), and the move by independent vendors like Blizzard to offer their own Internet links for their own games (Blizzard's is called battle.net).

Speaking of online and gaming, Bandai's @World, which is based on Apple's Pippin technology, is being positioned as the low-cost, Net-ready, game-playing platform unit for the masses. @World will let you surf the Web on your TV and play some CD games (movie-based karaoke, for example). Developers that have lined up to support the @World platform include Activision, Hasbro Interactive, and Viacom—among others. —J.O.C.

Plextor 8Plex PX-83CS

TOP 5 CD-ROM DRIVES

	Last ranking	Last reviewed	Street price	Overall rating	Performance score	Access time	Throughput	Spin rate/bus type/feed mechanism	Reader service number	Comments
1 Plextor 8Plex PX-83CS 800/886-3935	1	current	$399	90	90	107	1199	8X/SCSI	774	Peerless performance and outstanding utilities make this drive worth every penny.
2 NEC MultiSpin 6V 800/632-4636	2	current	$99	90	65	150	891	6X/IDE	775	Rock-bottom price from a top-tier vendor, but the 6V is no speed merchant.
3 Goldstar GCD-R580B 800/243-0000	–	current	$189	88	77	139	1203	8X/IDE	776	A bargain price and nice upgrade bundle overcome lackluster performance.
4 Teac CD-58E 213/726-0303	–	current	$199	86	84	115	1205	8X/IDE	777	Fast drive, decent price, but slim support policies are a concern.
5 Mitsumi FX800 800/648-7864	–	current	$199	85	75	137	1203	8X/IDE	778	Mediocre benchmark scores hold back this budget-minded 8X drive.

Methodology We tested drives on a Gateway P5-166XL with 16MB of RAM and Windows 95. The following tests were run at 1024 by 768 at 256 colors: Macromedia Director 5.0 I/O benchmark, Microsoft Encarta 96 script, PowerFinder PhoneDisc 96 timed name search, MindScape CyberSpeed game installation. We also ran a 98-image slide show in Corel PhotoLab, and ran the CD-Tach low-level CD-ROM benchmark utility. The overall rating includes ratings for performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this article, circle reader service no. 915.

At Last, 8X Drives Deliver the Goods

This month's review of top CD-ROM drives introduces a slew of newly tested models, as well as our updated Windows 95 benchmark suite. The big news is that 8X drives have finally come into their own, with new models featuring quick access times that far outpace all but the best 6X drives. The SCSI-based Plextor 8Plex ran away from the pack with top finishes in every performance test, plus excellent setup and design. If you're on a tight budget, check out Teac's fleet-footed CD-58E, which finished second overall in our benchmark tests, yet costs just $199. The only 6X drive on the list, NEC's MultiSpin 6V retains second place from last month, chiefly on the strength of its new two-digit price.

This Plum's a Peach

Editing and digitizing high-resolution video to your hard disk doesn't have to take all day. The Plum, a single-card Plug and Play capture board from Interactive Images, can digitize audio and video at up to 6MB per second at a resolution of 720 by 480 (meeting the CCIR-601 television standard for broadcast quality); in addition, it provides time-saving acceleration for rendering Adobe Premiere transitions.

The Plum works with Windows 95 (NT drivers should be available in September) and installs in less than an hour. Its design—an external interface box that attaches to the Plum via a proprietary SCSI-type cable—lets you easily plug video equipment in, without fussing with your computer. Your audio and video cables connect to the box instead of to the card, minimizing intruding levels of interference and noise.

Plum uses the standard AVI format to capture video. Competing manufacturers (including Targa and DPS) use proprietary algorithms such as DVM and PVD to achieve data rates that meet or exceed 6MB per second, but of course 90 percent of video editing software does not support these algorithms. And though the 2GB partition limitation in Windows 95 poses a problem for digitizing longer clips, Plum can play an uninterrupted AVI file over multiple partitions.

Best of all, you no longer have to resort to using the Make Movie command in Premiere before you play a final AVI out to tape. This time-saving feature can reduce your use of disk space for video capture by up to 40 percent.

When you consider that these attributes are supplemented with goodies like Dynamic Q factor (to minimize dropped frames), integrated software controls for most VCR/VTRs, and the bundled full version of Premiere 4.2, Plum offers you a complete digital editing suite. —*Richard Popko*

The Plum video capture board.

- **Plum** $3995 list; Interactive Images; 800/336-1912. Grade: **A-**

Reader service no. 779

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Sound Blaster AWE32 PnP

TOP 5 SOUND BOARDS

	Last ranking	Last reviewed	Street price	Overall rating	Record score	Wave playback score	MIDI playback score	Wave-table RAM (installed/max)	Wave-table ROM/ number	Reader service number	Comments
1 Sound Blaster AWE32 PnP 800/998-5227	1	Jun 96	$250	92	63	89	90	1	780		Excellent playback; downloadable wave-table sounds; expandable RAM.
2 CrystaLake Model 110 503/222-2603	–	current	$169	92	80	65	90	1	781		Outstanding audio at a bargain price, but crosstalk will muddy stereo sound.
3 Advanced Gravis UltraSound Plug & Play Pro 800/663-8558	2	May 96	$199	90	90	82	60	1	782		Best recording performance, but poor MIDI sounds; affordable price.
4 CrystaLake Model 140 503/222-2603	4	Jun 96	$295	88	67	73	90	4	783		Decent overall audio with outstanding MIDI; most expensive board in Top 5.
5 Creative Labs Sound Blaster 32 800/998-1000	3	May 96	$170	88	55	90	90	1	784		Same as #1 AWE32 but without customizable MIDI; best overall playback.

Methodology Boards are tested on an Audio System Precision 2 workstation to determine frequency response, crosstalk, noise, and distortion levels, and other characteristics. We judge MIDI and wave audio quality by comparing sample sounds against original source material on DAT. The overall rating includes ratings for performance (40 percent), features (25 percent), price (25 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this article, circle reader service no. 916.

CrystaLake's Bargain Board

CrystaLake Multimedia is at it again, this time with its bargain-priced Model 110 board. The $169 Model 110 performed well on the test bench, delivering some of the lowest levels of noise we've ever measured, and microphone recording quality far superior to that of most competing boards. However, crosstalk (leakage of sound from one channel to the other) was barely acceptable, and the board lacks downloadable MIDI sounds as well as the reverb and chorus effects found on the Model 140 we tested in June. Built-in SRS surround sound adds a spacious effect, while a unique graphical interface lets you choose just the right amount of 3-D enhancement. Plug and Play installation, a strong software bundle, and generous 3-year warranty help make the Model 110 a terrific buy.

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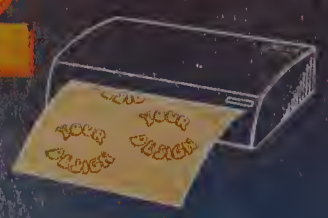

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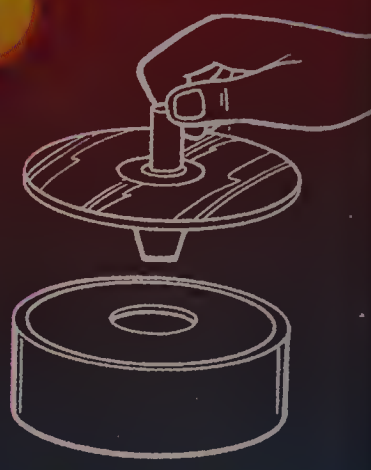

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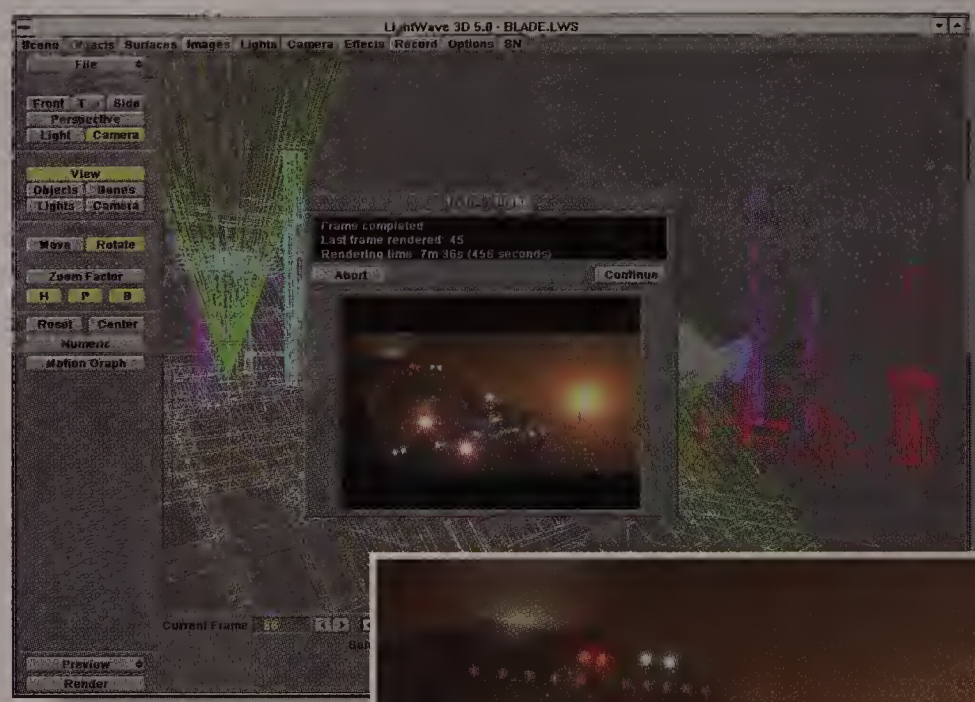
Lights, Camera, Animation!

The only thing that wows folks more than special effects are special prices. High-end tools have fallen so dramatically in cost that 3-D and animation are now accessible to most users. To stand out, a product must meld great reputation and ease of use with robust features and low cost—as NewTec's LightWave 3D 5.0 does.

The package has been used to create special effects and animation in such TV shows as "Nowhere Man," "Sliders," "Seaquest," and "Wired TV." Producers discovered LightWave (for Amiga) in 1991, and the rush was on in 1995, when the PC version arrived. But we hadn't heard from NewTec since last year, raising doubts about LightWave 3D's ability to compete with high-end packages such as 3D Studio Max. Version 5.0 puts these questions to rest.



LightWave 3D's modeling tools support Open GL rendering of models, so image maps or textures can be applied to surfaces within the modeler, with the results visible in real time.

Movie-making Metaphor

LightWave 3D's structure and interface are based on movie making. The Layout module contains the setup of a sound stage, where cameras and lights behave as you'd expect and have amazingly intuitive icons. LightWave's camera is located on the set from the beginning and looks at your actors (objects), so—unlike with other 3-D software—you don't have to go through the headache of creating a camera object and setting it up. Instead, you just look through LightWave's view-finder and track in, out, or around with the camera. What's more, you can select objects with complete precision, which helps you avoid costly selection mistakes. Lights are fully controllable and easy to set up.

The most spectacular new feature of 5.0 is MetaNurbs. Make a box, hit the <Tab> key, and the polygon-based box transforms into a soft, curved shape. This is your magical sculpting clay. Subdivide it a few times, using the Metaform option; or push, pull, or bevel it to create any organic object you need. Switch to the Metaball plug-in to create a human body or other sophisticated figure by adding spheres (assuming you have enough RAM: You need 64MB to work efficiently). MetaformPlus changes simple polygons into more complicated shapes with fewer curves, but it offers a lot more control than you have while using MetaNurbs. For spline modelers who can't remember the right order of curves for making a patch, AutoPatcher is ideal: It does the job all by itself.

To create a galaxy of glowing lights, use the LightSwarm plug-in, which replaces the points of any object with lights. You can save the resulting effect as a scene file for use in the Layout module. LightWave's use of Open GL rendering—a graphics standard that helps users view and create models and animations in real time—is the fastest we've seen for PCs. You can apply image maps or textures to surfaces within the modeler and see results as you work.

Speed Rendering

In the Layout module, you can use up to four lights with the Open GL renderer, and you can change the size of the light cones on the fly. Using an Intergraph TDZ 300 Pentium Pro, we rendered full-screen animation previews and played them back without frame drops. Animation has also improved: An Active Goal object attracts a chain of hierarchy that enforces movement, so constructing inverse kinematic animation is easier. You can also determine the strength of the Goal object—to accelerate or retard reactions, for example. Finally, you wield control over the size of the Lens Flare.

Don't let its affordable price fool you: LightWave 3D is a great package. All it needs is more detailed documentation and online help. High-end users who've paid $4000 for 3D Studio Max should try LightWave and expect blockbuster results. —*Bijan Tehrani*

- **LightWave 3D 5.0** $1495 list; NewTec; 800/862-7837. Grade: **A-**

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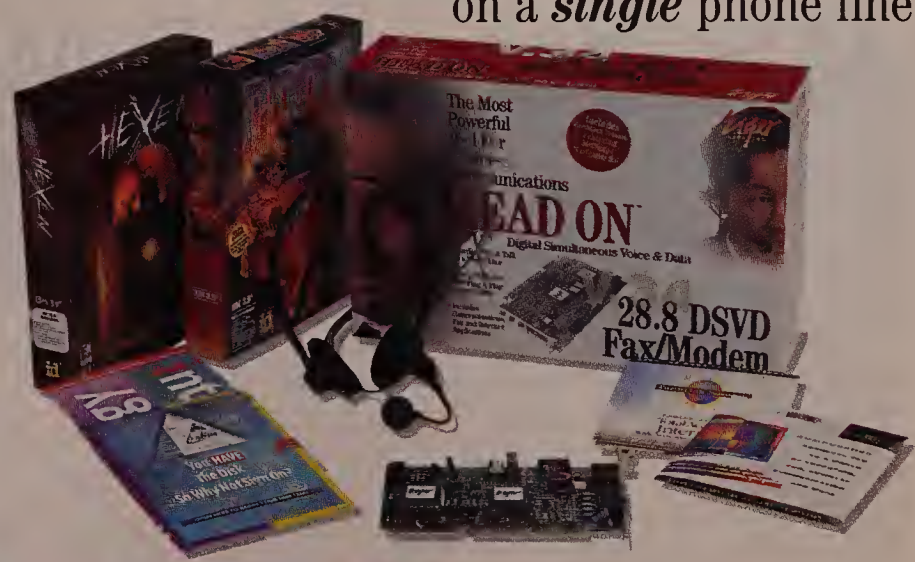

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Web-worthy Creations

Expo gives presentations power.

Avoid joining the ranks of the Web's worst site designers. Expo, from Paul Mace Software, helps you produce fast, lean, interactive presentations for the Web.

Expo is a programming environment that comes with its own proprietary programming language. It includes a compact, license-free runtime module that you can configure as a plug-in for Windows or Netscape Navigator (or other Web browser), so you can distribute your creation to persons who don't have the program.

The package uses computing power instead of bandwidth, when appropriate. Expo employs a "streaming on demand" mechanism, so a network-based program can start playing while some of its resources are still being delivered to your computer.

Expo's programming language allows you to send bit maps (compressed in Expo project files), words, and text flying around the screen and to synchronize the motion with MIDI, WAV, AVI, and FLC files. It lets you create interactive applets complete with music and motion that fit in 50K. The applets start running within seconds. (See http://wsdesigns.com/wsirota/expo1.html —my sample page—for an example.)

While testing Expo, I encountered some bugs. First, improper palette handling caused the wrong colors to appear in presentations. Second, the utility that packaged the G scripts and media elements into Internet-ready form occasionally destroyed MIDI files. Third, giving a scene the right look and timing takes a lot of tweaking (in fairness, few animation programs make this task fast or easy). Finally, the graphical tools are poorly documented and cumbersome.

Nonprogrammers will have trouble learning to use Expo effectively: The helpful templates promised on the product box boiled down to a single useful demo file. Experienced programmers will dislike the inelegant programming constructs (it's hard to avoid GOTO commands, for example), but they will grasp the language quickly.

Other popular packages now port easily to the Web. But Expo demos had fewer interruptions for file transfers from the Web than did Gold Disk Astound presentations in my tests. —*Warren Sirota*

- **Expo** $399 list; Paul Mace Software; 800/944-0191. Grade: **C-**

Reader service no. 786

Mac-based 3-D Moves to the PC

Form Z 2.8 set high 3-D standards on the Mac, and it loses little in translation to Windows. Despite a steep learning curve and a $1995 retail price, Form Z is a 3-D illustration workhorse. Both the rendering quality and the scope of the program's design tools are exceptional.

Form Z provides superior solids modeling for creating and rendering precise and realistic 3-D objects, making it especially useful for architectural applications. But Form Z lacks animation—a major strength of 3D Studio Max and a feature that's popping up even in some low-cost 3-D illustration programs.

Design tools are accessible from eight tool palettes, with groups of similar functions blocked together. For instance, you can reach all types of 2-D surface objects in one step, and you can extrude these shapes into 3-D solids or use advanced transformations to modify them.

And Form Z generates true solid models, so you can represent the density of materials. With the package's mathematical curves, you can create CAD-accurate drawings without importing or exporting files. Even so, Form Z provides a respectable array of filters for accepting vector and bit-map file formats.

Form Z's RenderZone offers seven rendering qualities for versatile model imaging.

Boolean operations (union, intersection, and difference) permit you to weld primitive 2-D and 3-D shapes into complex forms easily. Another option is to sculpt objects by inserting or deleting points that lie on a surface or within a model's interior.

RenderZone, the rendering portion of the Form Z program, can image models at resolutions of 16,000 by 16,000 pixels or less, readying them for anything from animation to exacting print applications. You can select from seven rendering qualities, as well as different lights, procedural textures, and environmental mappings. —*Mike Heck*

- **Form Z 2.8** $1995 list; Autodessys; 614/488-8838. Grade: **B**

Reader service no. 787

Point-and-Click Composing

Even if you don't know a clef from a clavier, you can create sophisticated MIDI files with a sequence generator—a program that composes MIDI music according to parameters you specify, such as musical style, tempo, chord changes, and key. We look at new versions of two top packages here.

Soundtrek's Jammer Pro 2.0 employs a highly original method for creating music: Pick a musical style; hit the Compose button; and the program generates a melody, chord changes, and instrumental parts. You decide what to keep and what to recompose, changing parameters as you desire. Then you repeat the process until satisfied with the sound. With patience and a good ear, you'll find your groove. You can print chord changes but not standard notation. The default font is too small for musicians to read onstage.

It takes time to master the subtleties of Jammer, but by using the tutorial and documentation, you can quickly achieve decent results.

Jammer isn't perfect. The dialog box for choosing a band style is awkward and must be used repeatedly. You get only a dozen basic band styles (more come in a $30 add-on package). Worst of all, the parameters used to create each measure aren't preserved, so it's difficult to recompose parts after you've loaded other styles.

PG Music's Band-in-a-Box Pro 6 offers only two styles per song (versus Jammer's unlimited number) and has no tool for automatically generating chord progressions and melodies. But if you want to arrange jazz and Latin tunes, Band-in-a-Box can't be beat. It also does well with country, reggae, and R&B, but most of the rock styles tend toward mood-oriented lameness.

The software's harmony presets make creating lushly supported melodies easy, and the program prints attractive lead sheets and chord charts. Both Jammer and Band-in-a-Box let you export your song as a standard MIDI file and edit the music further in another sequencer program.

Multimedia music producers can have a ball with Jammer, while jazz and Latin musicians will prefer Band-in-a-Box. —*Warren Sirota*

- **Jammer Pro 2.0** $199 list; Assorted Band Styles Volume 1 $29.95; Assorted Drum Styles Volume I $29.95; Soundtrek; 800/778-6859. Grade: **A**

Reader service no. 788

- **Band-in-a-Box Pro 6** with 4 Styles disks, $88 list; with 6 Styles disks, $147 list; extra Styles disks, $29 each; PG Music; 800/268-6272. Grade: **B-**

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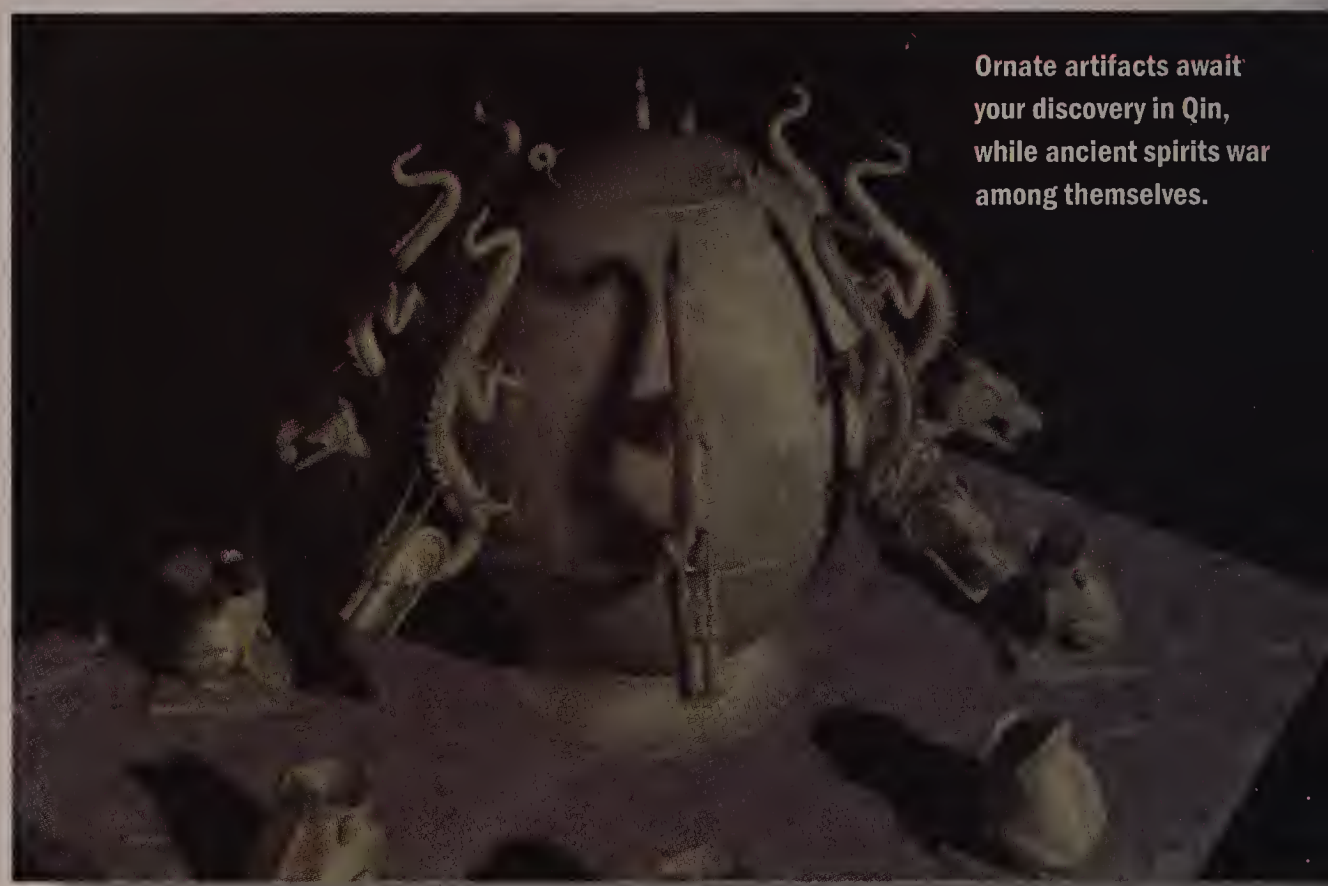
Keys to the Qin Tomb

Most game makers find it difficult to create a believably resonant myth as a backdrop, while most edutainment software leans on the "edu" but tends to struggle with the "tainment." Time Warner's Qin: Tomb of the Middle Kingdom, though, surmounts these obstacles to emerge as a fine puzzle alternative for people who loathe the many Duke Nukem–style games of digital bloodletting.



Ornate artifacts await your discovery in Qin, while ancient spirits war among themselves.

The History

In 1975, archaeologists discovered a host of terra cotta soldiers in a burial mound in China. These figures formed an afterlife guard for Qin Shi Huangi, who reigned some 2,000 years ago as China's first dynastic emperor ("China" translates to "Middle Kingdom" in Chinese). Those soldiers guarded an elaborate tomb complex that may exceed the pyramids in scope, and may be as fully intact as King Tut's resting place—making it perhaps the greatest archeological find of this century. The Chinese government claims it can't afford an archeological dig, but superstitions about the fearsome emperor's spirit and concerns about Indiana Jones–type booby traps have probably discouraged digging as much as has the lack of funds. So this legendary city of the dead—half a kilometer in diameter—remains untouched.

Until now, that is. In Qin (pronounced "ching"), you play a volunteer participating in the first archeological dig at the tomb. Of course, wandering alone, you fall through broken earth into the tomb itself—and into a struggle between antagonistic spirits that has raged for two millennia.

Otherworldliness

The uncanny experience of an alien yet wholly consistent mythology is pervasive: Qin's designers painstakingly researched Chinese legend to create the supreme otherworldliness of the game's realm—as distant from Western sensibilities as something from Atlantis, Mars, or the world of Myst.

The writing you find in the tomb is in ancient Chinese. Luckily, these pictograms are all translated in an online glossary. In fact, some of the game's puzzles are based on the use of radicals in Chinese, where characters that have different meanings are combined to create a composite character with a new meaning. For instance, combine the character for "door" with the character for "separate," and the resulting radical may cause a passage to open. The dialog of the spirits that haunt the tomb is spoken in Chinese, with subtitles; the music was composed by a Chinese musician and played on authentic instruments. The atmosphere is complete: All that remains is for you to resolve the conflict between the emperor's spirits and those allied with his chief architect, who designed the Tomb of the Middle Kingdom.

The artifacts and puzzles are tied to Chinese tradition. Wonders of ancient Chinese science, exemplified by the ornate seismograph, are rendered in SVGA splendor; and the game's art and design recall pieces from the stunning Splendors of Imperial China exhibition (now on display at Chicago's Art Institute).

The online glossary is encyclopedic, full of information on Chinese medicine, philosophy, and history; you could spend hours browsing there. With its entrancing zenlike puzzles and historical curiosities at every turn, Qin is a better Myst than Myst itself.

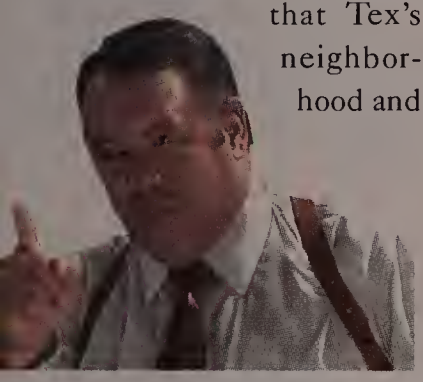
—Bernard Yee

- **Qin: Tomb of the Middle Kingdom** $39.95 list; Learn Technologies Interactive/Time Warner Electronic; 212/522-4851. Grade: **B+**

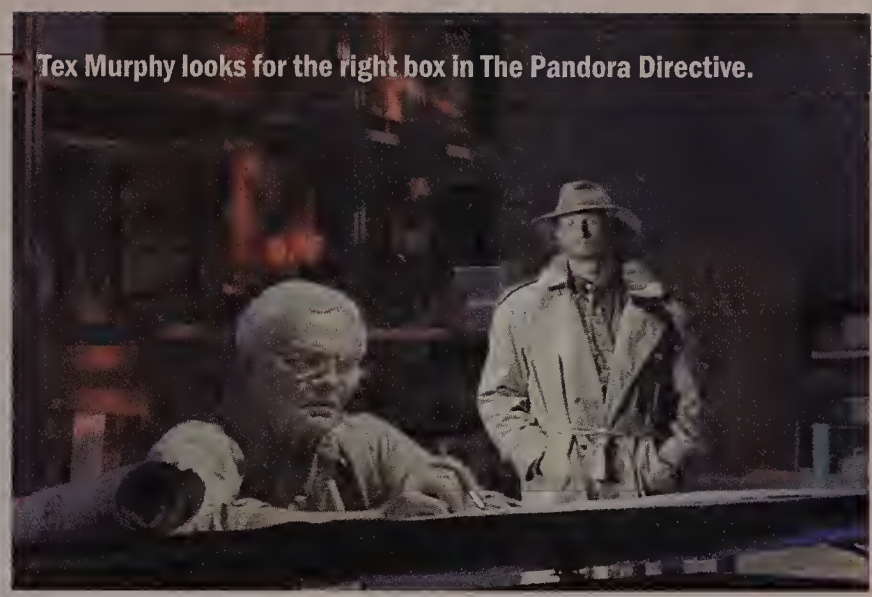
Reader service no. 759

The Tex Files

Alien autopsies, government conspiracies, mutants... Is it an "X-Files" rerun? Nope, it's the latest interactive movie from Access Software, The Pandora Directive. You play the role of Tex Murphy, a San Francisco gumshoe of the 21st century. (Tex was also the lead character in Access's 1994 smash hit Under a Killing Moon.) Fans of Killing Moon will discover that Tex's neighborhood and friends are still around, with some minor changes. In fact, several famous faces grace the screen: Barry Corbin (of TV's "Northern Exposure" and the film *War Games*), Tanya Roberts (of *View to a Kill*), and Kevin McCarthy (of the most recent *Invasion of the Body Snatchers*).



The Pandora Directive retains its predecessor's interface and movement, but the sequel sports clearer graphics and smoother video than the earlier title had. You wander around, gathering clues and accessing an inventory for using the tools you've collected. A help button provides layers of hints, but you lose points if you rely on it.



Tex Murphy looks for the right box in The Pandora Directive.

The feature that sets Pandora apart from the interactive mystery pack is the flexibility of its interactivity. You use a virtual world engine with no prerendered paths to navigate through the mystery to one of seven endings. For maximum smoothness of operation between game play and transitional movies, the transitions are shot on blue-screen, yielding some cheesy semirealistic backdrops.

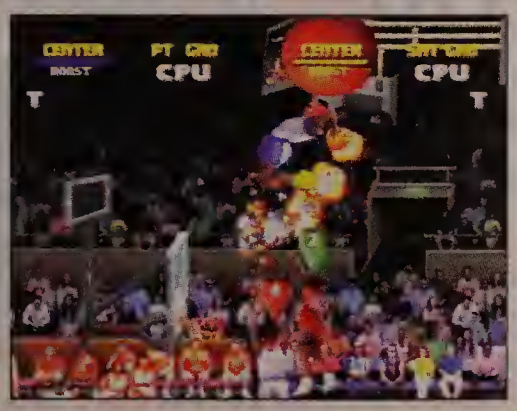
Though the story starts a bit slowly, it eventually takes off like a bullet. I saved my game 57 times along the way, knowing I could die at any time. Most people won't try to run through it seven times, but Pandora still offers hours of game play, no matter how you slice it. —*Andrew Yoo*

- **The Pandora Directive** $79.95 list; Access Software; 800/800-4880. Grade: **B**

Reader service no. 760

Alley-Oops

The idea seems foolproof: Introduce the mega-popular NBA Jams formula to the collegiate ranks, including 44 of the country's top college basketball teams. Then set up a tournament to establish who is number one. But the problem is that the competition has changed since NBA Jams first arrived. New games—specifically, Electronic Arts' NBA Live 96—have upped the ante in terms of playability and realism. The result is that, despite the game's multiplayer and create-your-own-team capabilities, College Slam looks outdated.



College Slam earns a gentleman's C.

On top of that, the game can be quite annoying. From the perspective problems with rebounding and picking up loose balls to the exceptionally irritating announcer screaming pseudo-college-oriented one-liners like "He delivers the thesis!" College Slam never manages to capture the flow and pace that make top-notch hoop games so much fun to play. —*Hugh Foster*

- **College Slam** $54.95 list; Acclaim; 516/656-5000. Grade: **C**

Reader service no. 761

Incline and Rise

Rome wasn't built in a day, but in just 2 to 4 hours you can build a civilization in Greece, Egypt, Mesopotamia, China, India, or Northern Europe, in The Rise & Rule of Ancient Empires. Warriors, take heed: There's a lot more rising and ruling than hacking and hewing in this turn-based game. Rise & Rule is about constructing buildings one at a time, checking resources, improving efficiency, and boosting morale. You spend most of your time clicking buttons and scrutinizing bar graphs. And when combat occurs, it's over in a sudden puff of smoke. As the manual understates, "game combat is highly abstract."

You can complete a whole game in one sitting; and the cities you build conform to the prevailing architectural style. Graphics are lush and finely rendered, and the orchestral musical score is solid. Strong on detailed graphics but weak on excitement, R&R supports four-person modem and network play—but only on Windows 95. —*Paul Hyman*

Rise & Rule lets you enjoy the thrill of production supervision.

- **The Rise & Rule of Ancient Empires** $54.95 list; Sierra On-Line; 800/757-7707. Grade: **B**

Reader service no. 762

Dipping a Toe Into New Frontiers

No subject commands the attention of the world's digerati with more authority than does Star Trek. The number of Internet sites alone is staggering: A search on a major engine yields up to 10,000 hits.

Like the flagship of free enterprise, Star Trek continues to beam titles into our universe. One of the newest is Simon & Schuster Interactive's Star Trek Klingon. The game re-creates the Star Trek characters and universe faithfully, showing attention to detail in the costumes, quality of acting, and sets; but it leaves something to be desired in replay value.

Say, *Tlhlngan hol dajatlha?* ("Do you speak Klingon?") Whether you just want to learn enough to get by as a tourist or you are an active member of the Klingon Language Institute (visit it at www.kli.org on the Web), this is the title for you. You play the role of a cadet training at Star Fleet Academy and studying Klingon language and culture. First you learn approximately 200 phrases of the Klingon language in sessions at the Language Lab. This is the most inventive and engaging part of the game, as Dragon System's speech recognition technology is used to good effect to teach you the proper way to speak Klingon.

Klingons tolerate the Language Lab for only so long.

In the next phase of play, the game's motto of "Learn or die" would be more accurately restated as "Learn or we'll make you repeat the same sequence until your eyes glaze over." You enter the holodeck as Pok, a young Klingon who must come to terms with his father's death and with his own need to avenge it. The Duck Corporation's full-screen Truemotion-Svideo is impressive, and your success in solving the mystery depends on your fluency in Klingon (mastered in the Language Lab), but game play is limited and takes just a few hours to complete. —*Ean Houts*

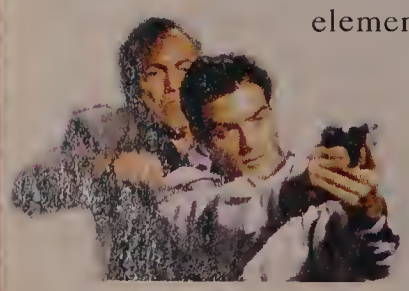
• **Star Trek Klingon** $69.95 list; Simon & Schuster Interactive; 800/910-0099. Grade: **C**

Reader service no. 763

Peer Pressure

Voyeur II lets you peep into the elegant rural retreat of a murdered millionaire, training your video camera on various rooms of the swank home and trying to prevent the death of glamorous Elizabeth Duran—the last lover of the late Dr. Everett Cussler (and a beneficiary under his will). Each room your nosy character scans reveals a different scene of high-rent hanky-panky involving Cussler's various jilted heirs-apparent.

Voyeur II applies interactive elements cleverly as you search your cabin for more tools to prevent the murder. The animation and sound are utterly convincing: The scenes inside the rustic cabin are full of convincing details, like the old radio's staticky reception of a faraway signal and the creaking of the cabin floorboards as your character moves about the room.



Seeing is bereaving in Voyeur II.

The presence of 1970s stars Jennifer O'Neill and Dennis Weaver doesn't heighten the play value. Voyeur II may be thoughtful, imaginative, and well-produced; but the endless peeking can be confusing and boring—making Voyeur II far from a peerless effort.

—*Howard Polskin*

• **Voyeur II** $49.99 list; Philips Media; 800/883-3767. Grade: **C**

Reader service no. 764

Nonstop Abuse

Two-dimensional side-scrolling games hark back to the 1980s, but Crack Dot Com's Abuse breaks the mold.

Nick reasons with his opponents.

The controls instantly distinguish this game from its side-scrolling brethren. The main character, Nick, has a mouse-controlled firing radius of 360 degrees. All his other movements are controlled by the arrow keys. On all 21 levels, the play is fast, furious, and habit-forming. The setting is a futuristic prison in which everyone has gone mutant. The Giger-esque ambiance of the place, as well as the cool sound effects, keep the game play fresh and exciting for hours. With network play for up to eight people, you can also share the adrenaline boost with your buddies.

An included game editor lets you customize levels or update the original 21. The only disappointment is the lame reward you get for completing all the levels. (Don't ask.) Try Abuse: You might like it. —*Matthew Sanner*

• **Abuse** $40 list; Crack Dot Com/Origin; 800/245-4525. Grade: **A**

Reader service no. 765

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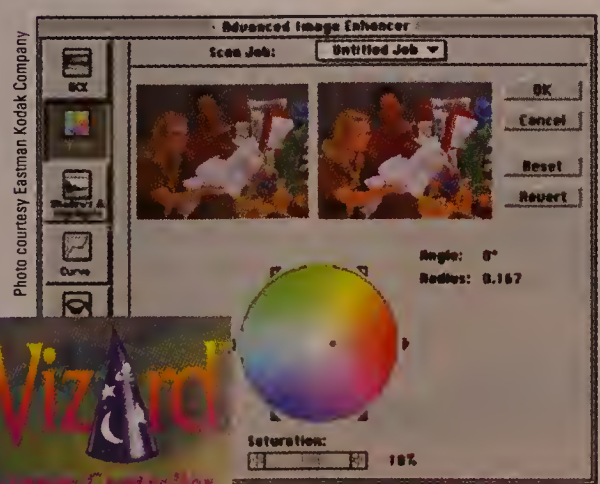

Photo courtesy Eastman Kodak Company

"◆◆◆◆" *MacWEEK* (August 7, 1995)

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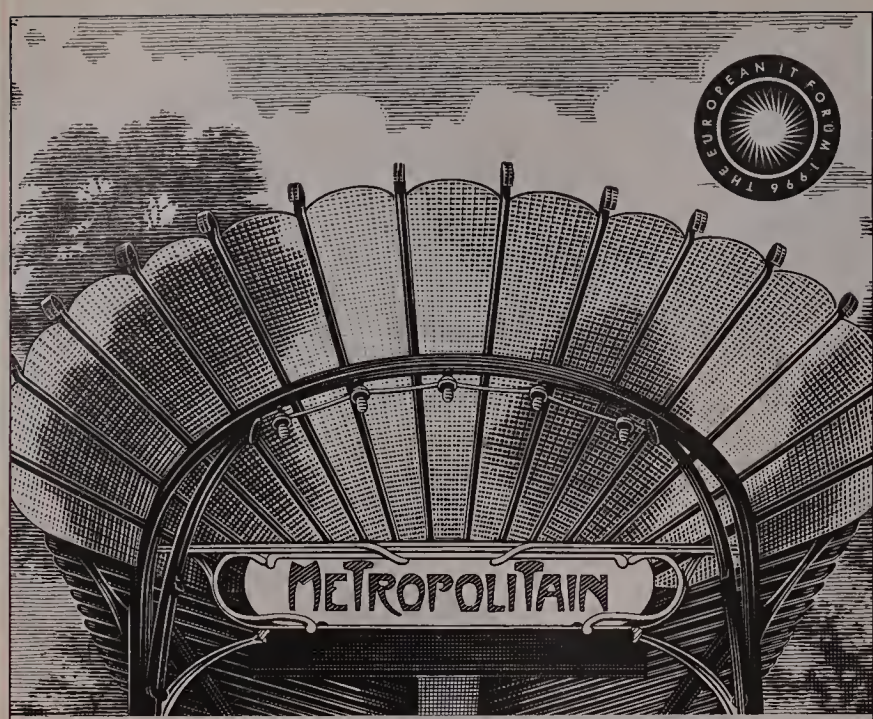

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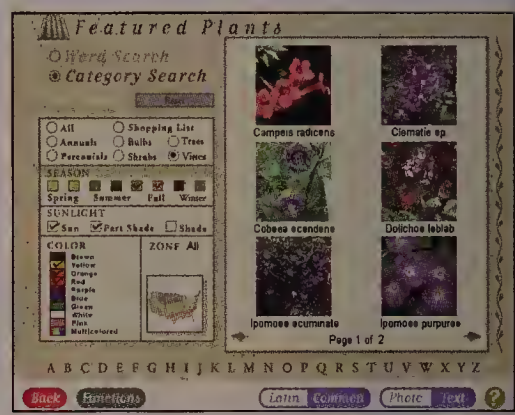
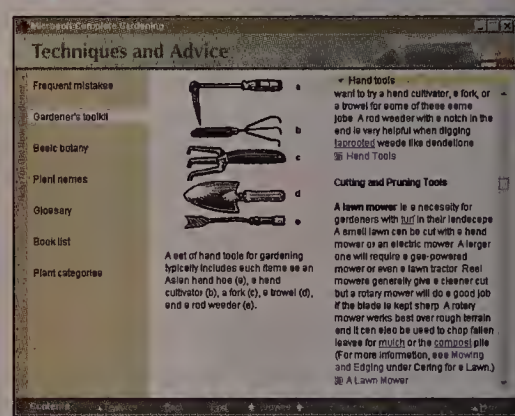
Green Thumb Wirescaping

Given the recent innovations in interactive technology and 3-D design, it's no surprise that we are beginning to witness a highly productive convergence of design, nature, and technology. Two new titles in the fields of home gardening and of landscape design—Microsoft's Complete Gardening and Hearst New Media's In Full Bloom—knowledgeably respond to the needs of both novices and expert gardeners.





In Full Bloom (top) and Complete Gardening: Grow it and dig it.

Complete Gardening, Microsoft's entry, offers you dazzle, superior controls, and encyclopedic information, plus photographs geared to multiple levels of gardening knowledge. The brain of the disc, the Plant Encyclopedia, has a sexy interface, featuring sliding columns and tabs (for techniques and advice) leading to plant descriptions, a photo browser, and a plant selector. The Media Garden has drawings with video hot spots, while the Plant Problems section yields redwood-size trees of disease factors and garden inhibitions, each searchable by name or by a combination of type of plant and type of problem.

Despite suffering an occasional dropped audio, In Full Bloom: Great Home Gardens brings home the goods: Vivid photos, smart design commentary, and easy-to-navigate gardens (with information links to plant properties and source listings) add up to a solid introduction to serious gardening. But be prepared for a very leisurely stroll, because this CD is as slow as molasses. The Tips and the included techniques videos are brief but understandable; and unlike those on many other CD-ROMs, they focus on real tasks, such as dividing perennials or using retaining walls to help counter slope erosion.

—*Diane Mehta*

- **Microsoft Complete Gardening**
  $34.95 list; Microsoft; 800/426-9400. Grade: **A**

Reader service no. 766

- **In Full Bloom: Great Home Gardens**
  $39.95 list; HomeArts/Hearst New Media; 800/556-9182. Grade: **B**

Reader service no. 767

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Enhanced Dread

Like Beatles or Elvis fans, Bob Marley aficionados always hope to discover a precious, never-before-heard gem. Soul Almighty: The Formative Years contains five previously unreleased Bob Marley cuts from the days before he became an international superstar. First, sound engineer Joe Venerri painstakingly restored the old and deteriorating sessions tapes of songs like "Splish for My Splash" and "Stranger on the Shore." Then, true to the reggae/dub tradition, various studio musicians added new tracks, thus creating remixes that complete the original cuts quite well. (You can listen to the original cuts side-by-side with the remixes—a wonderful application of multimedia technology.)

The disc's multimedia elements include a new music video of "What Goes Around Comes Around" (but without any actual video of Marley, unfortunately), an excellent album chronology, a picture gallery, a Rastafarian glossary (without pronunciations to handle the Jamaican patois), and a handful of disposable video interviews with longtime Marley associates.

Soul Almighty presents raw cuts and remixes of early Bob Marley.

Of the five restored tunes, one is presented in its original form, unadorned with new tracks. "Selassie Is the Chapel" is a rare spiritual number previously available only in a private pressing. I would have preferred a disc with less video (or more Bob Marley on video) and more music. Still, this is an excellent effort that any reggae fan would be delighted to own. —*Warren Sirota*

- **Soul Almighty: The Formative Years**
  $17.98 list; JAD Records.
  Grade: **C+**

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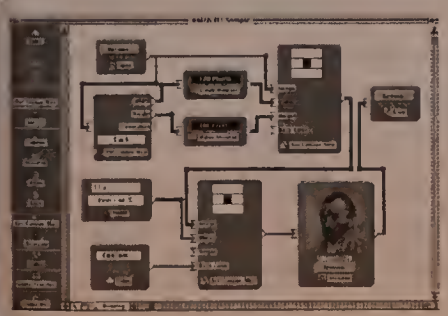

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If You Build It,

From corporate presentations to computer-based training, new **multimedia authoring packages** allow you to build compelling applications. We review five leading tools that can turn you into a professional multimedia developer.

BY MIKE HECK

BILL FRAMPTON

Multimedia authoring has never been easier or more compelling. New authoring packages provide powerful, flexible tools for turning disorganized content into an interactive experience. Of course, no product can address every purpose, whether technical or artistic. You need to select the best tools for your project and for your level of expertise. Visual Basic 4.0, for example, offers exceptional database access and programmatic control, but lacks any crossplatform capability and requires extensive coding. Macromedia's Director 5.0, for its part, delivers an attractive balance of power and convenience, but requires that you master the Lingo scripting language for sophisticated jobs.

To help you choose the right tools for your particular constellation of tasks, we rounded up five prominent multimedia authoring packages for Windows PCs. All are full-featured development systems suitable for creating stand-alone applications, and (not surprisingly) all require that you have at least an intermediate level of computing experience.

They Will Come

Building Blocks

All five programs provide a graphical interface for positioning media as well as design tools for adding buttons, text, lists, and other object types. High-level scripting languages let you exercise precise control, perform calculations, accept and process user input, and even link to other applications. Projects usually consist of individual screens—called cards, pages, or scenes—which act as containers for multimedia objects. Graphical controls enable you to move among assembled screens, while controls and scripts permit you to assign behaviors to objects contained within the screens.

Of course, file support is key. You'll need to access various audio, video, and bit-map graphical file formats, incorporating these media into your presentations. After importing your objects, you can add simple interactivity by changing object properties: A pop-up dialog box, for instance, might let you indicate that pressing a button will jump the user to a different screen. In some packages, such as Asymetrix's Multimedia ToolBook 4.0, property settings control advanced functions such as playing audio files and prompting screen transitions. All of these programs, with the exception of Oracle's Media Objects, include MCI objects for controlling video decks, laser discs, audio cards, or other hardware.

Get With the Script

Though these packages tend to be oriented toward nonprogrammers, their scripting languages let you handle sophisticated operations and process user input. If you are not a programmer, look for an easy-to-learn scripting syntax and interactive tutorials and code libraries to gain practical experience with the product's language. Multimedia ToolBook and Macromedia's Director 5.0 offer the most accessible scripting tools for nonprogrammers.

The Overall Rankings

1. **Macromedia Director 5.0**
   PROS: Flexible, intuitive interface; precise synchronization; crossplatform development; extensive distribution and playback options.
   CONS: Requires mastering Lingo scripting; average media editors.
2. **Asymetrix Multimedia ToolBook 4.0**
   PROS: Simple navigation controls; powerful OpenScript language; strong media editors and Script Editor.
   CONS: Moving pages isn't fluid; editing requires cutting and pasting.
3. **Strata MediaForge 2.0**
   PROS: Object-oriented, drag-and-drop interface; advanced options and special effects.
   CONS: Media synchronization and control could be better.
4. **Microsoft Visual Basic 4.0**
   PROS: Strong programmability, database access, and connections to other applications; inexpensive.
   CONS: Difficult to learn; programming expertise required; executable files run only on Windows PCs.
5. **Oracle Media Objects 1.0**
   PROS: Easy media assembly; crossplatform development; high-level scripting language; strong distribution options; inexpensive.
   CONS: Mediocre animation tools and timing control; editing requires cutting and pasting.

Since not everyone runs Windows, you may want to distribute your applications to other systems or over the Internet. Four of the five programs we looked at (all except Visual Basic) provide at least Windows and Mac playback support, but you'll find the best crossplatform support with Director and Oracle's Media Objects 1.0. For online publishing, Director and Strata's MediaForge 2.0 feature the best Netscape Navigator plug-ins; and Media Objects provides strong ties to other Oracle products, such as the company's database and media servers.

Without question, developing professional-quality multimedia is a challenge. But authoring products are becoming easier to use at the same time that they are offering more distribution options. Now it's up to you to identify the product with the best balance of price and features for your individual needs.

ASYMETRIX MULTIMEDIA TOOLBOOK 4.0

Once a limited authoring package, Multimedia ToolBook has grown up. Version 4.0's fine balance of power and usability makes it an excellent choice for novice authors. The software is built on a book metaphor: The pages hold buttons, data fields, and multimedia—though I was disappointed by the need to cut and paste pages in order to move them.

When you start a project, ToolBook's application specialist asks a series of questions, automatically building your book's framework to your specifications. Dialog boxes let you change object properties, freeing you from having to script simple navigation or other interactive sequences; meanwhile, dockable toolbars and floating palettes provide quick access to common objects and commands. Various media editors, as well as a Script Editor (for writing OpenScript statements),

Asymetrix Multimedia ToolBook 4.0

smooth intricate authoring by permitting you to interact with and debug a script as it runs. You will have to master scripting to apply functions not available in the tool palette (such as text searching), but an extensive library of pastable script fragments eases the task. The software's support for custom-written OLE controls is useful for database access and other special needs; still, the program doesn't match Visual Basic in this area.

ToolBook's Windows setup program installs the needed run time and content, which can be optimized for playback on CD-ROM. A downloadable plug-in lets you play back Internet-based ToolBook titles. And by the time you read this, Asymetrix will have released most of its ToolBook II line, geared specifically for Internet-based distributed learning.

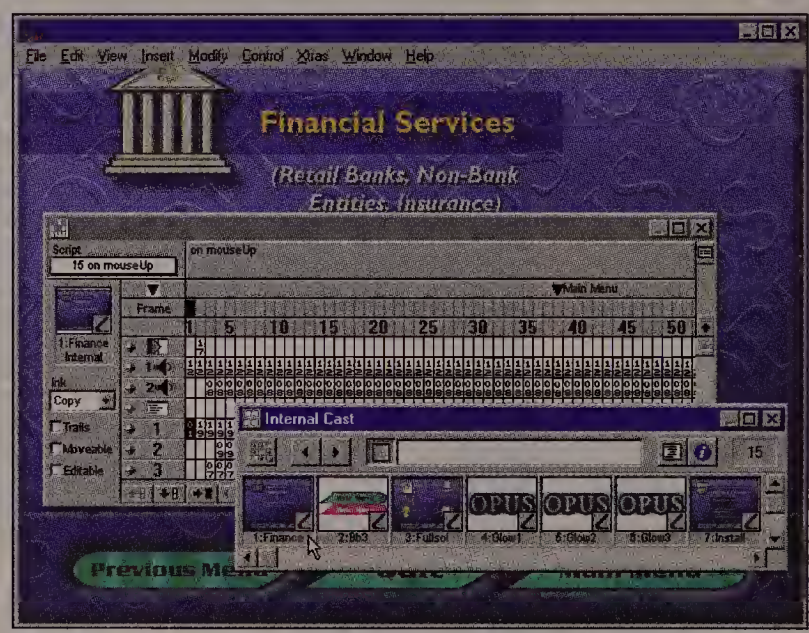
Grade: **A-**

MACROMEDIA DIRECTOR 5.0

A 32-bit upgrade of the popular authoring tool, Macromedia Director 5.0 provides enhanced flexibility and precision. The upgraded edition (estimated street price: $850) addresses some glaring weaknesses of earlier versions, including expanded file support, enhanced text handling, and better programmability. Combined with the effective stage-and-set metaphor, these enhancements make Director 5.0 the top product in our comparison.

Built around the score window, Director 5.0 provides frame-by-frame control over animated cast objects, playback of two audio channels, synchronized videos, and transformations. The spreadsheet-like interface simplifies control over object events and interactions, while providing superior precision.

On the programming side, support for multiple casts within a movie lets developers do things like replace content on the fly. These functions are controlled by nearly 100 new Lingo commands; additional new Lingo statements handle networking functions that support Internet distribution with Shockwave.



Macromedia Director 5.0

But Director's greatest strength may be its cross-platform talents. Director, unlike several competing packages, lets you develop applications on a Mac or a Windows PC, and it supports distribution to PCs, Macs, and Unix, and even to 3DO game machines. Macromedia's Shockwave, meanwhile, makes porting your rich Director projects to the World Wide Web a much simpler proposition.

Though the interface remains familiar, new icons address frequently used commands; in addition, an Xtras menu provides access to distortion features and to Adobe Photoshop filters (which can be animated). New 24-bit paint and animation tools such as onion-skinning transform graphics editing and cell animation into quick tasks. Macromedia has also addressed text handling—a weakness in Director 4—by directly supporting rich text format (RTF) files and adding anti-aliasing to smooth out jaggies.

Director Multimedia Studio, at an estimated street price of $999, packages Director 5.0 with Extreme 3D, xRes 2.0 (for editing, painting, and compositing high-resolution images), and Sound Forge XP for Windows—a great deal by any measure.

Grade: **A**

MICROSOFT VISUAL BASIC 4.0

Visual Basic 4.0 enjoys great popularity among Windows developers, thanks to its intriguing alloy of programming power and relative ease of use. It provides ample tools for building multimedia applications, but to harness them you must first learn the programming language. Another drawback: Visual Basic programs run under Windows only, making the program unsuitable for crossplatform work.

Microsoft Visual Basic 4.0

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Visual Basic 4.0's working environment—a toolbar, a toolbox, and a form window (where you can place controls, graphics, and digital sound or video)—seems fairly straightforward. You place objects such as controls and buttons on forms, and you specify behaviors in the code window. Object characteristics can be changed by using a properties sheet, but handwritten procedures define how objects interact. And though the code editor maintains useful lists of commands and events, you must accrue experience to master application development. The $99 package includes few creation or editing options for multimedia elements themselves.

On its own, Visual Basic accepts relatively few types of bit-map and draw-type graphics. But the package's OCX controls let you choose from a vast market of third-party add-ins that support image manipulation and other advanced functions. Among the built-in multimedia options are capabilities for controlling MCI devices, playing WAV audio files, showing AVI movies, and managing audio boards and MIDI sequencers. Visual Basic's outstanding database controls permit you to connect to external databases or create databases within Visual Basic by using the Jet database engine (the same one that is used with Microsoft Access).
Grade: **B-**

ORACLE MEDIA OBJECTS 1.0

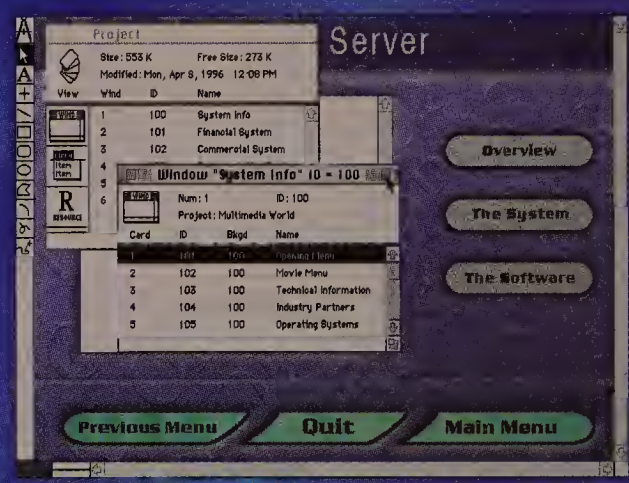
Anyone familiar with the Mac HyperCard authoring model will be comfortable with Oracle Media Objects. Users work with a stack or set of stacks that contain a number of cards. The cards maintain graphical layers and multimedia objects that are linked and managed with the high-level Oracle Media Talk scripting language. Like Multimedia Director, the $495 Oracle provides playback support on numerous desktop and set-top platforms, while ancillary products enable users to access enterprise databases or use Oracle Media Servers to deliver content over networks.

Assembling applications isn't diffi-

Title Development on the Mac

Apple's HyperCard application kicked off the multimedia authoring revolution a decade ago; and today HyperCard's many progeny (such as SuperCard and mTropolis) uphold the Mac's status as a preeminent development platform. And while market realities have driven most Macintosh multimedia authoring software vendors to provide Windows versions of their products, the Mac still provides unique capabilities for authoring.

ALLEGIANT SUPERCARD 2.5

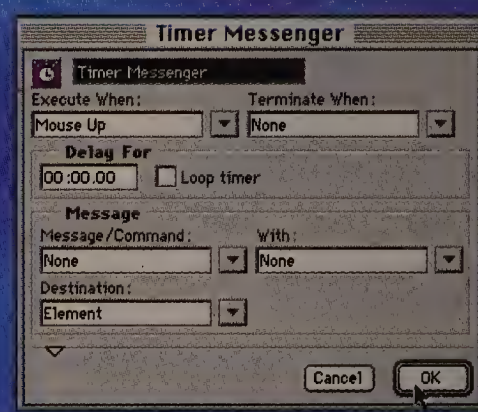


A powerful development system that's appropriate for nonprogrammers and experienced users alike, SuperCard boasts some unique features but doesn't permit users to tweak applications precisely. The package follows a Stack-Card design similar to that of Oracle Media Objects: An application can have up to eight floating windows with dialogs, scrolling text, and menus. You create these by using various tool palettes and system-supplied objects, such as navigation buttons and data fields. Database access, however, requires third-party XCMDs (add-ins).

The $399 SuperCard offers solid painting and drawing tools, but it imports only PICT graphics and QuickTime movies. Still, the latest version works with 24-bit images and has a new plug-in architecture for transitions. It ships with various effects, including Pixel Dissolve and Squish, that you can mix with custom-written transitions.

Unique features include path animation that enables you to move a PICS object (a sequence of graphics) to produce interesting effects. Other functions support recording sound and video, which you can facilitate by using the text-to-speech functions built into many Macintosh computers. The SuperTalk scripting language includes Apple's full set of HyperTalk commands plus many extensions. SuperCard also converts HyperCard 2.x stacks.

A Standalone Maker turns stacks into free-running applications (or you can use a free SuperCard player); but the package lacks a setup application and such distribution functions as CD-ROM optimization.
Grade: B-



MFACTORY MTROPOLIS 1.0

Widely discussed during the past year, mTropolis provides a powerful object-oriented architecture and a simple drag-and-drop interface. A well-designed matrix window depicts scenes and the elements within them, with virtually all the authoring done by direct manipulation: Drop a graphic into a scene, and double-click to change properties. For convenience, the $4995 mTropolis relies on an extensive collection of modifier palettes that eliminate much programming.

The object-based system lets you model sophisticated actions, such as collisions, without coding. Further, the program's open architecture permits developers to add functionality by writing special modifiers in C, C++, Pascal, or Assembler. More importantly, you can store any component you've customized—such as an animation that uses a group of modifiers—in libraries; this feature greatly aids team efforts by enabling developers to share or recombine existing components.

Building a title for distribution requires one menu selection. The software handles all the drudgery of media collection and optimization, and then produces a stand-alone application for Macintosh or Windows systems. One caveat: mTropolis currently lacks functions for Web and network deployment, though it will support these features in subsequent releases.
Grade: A

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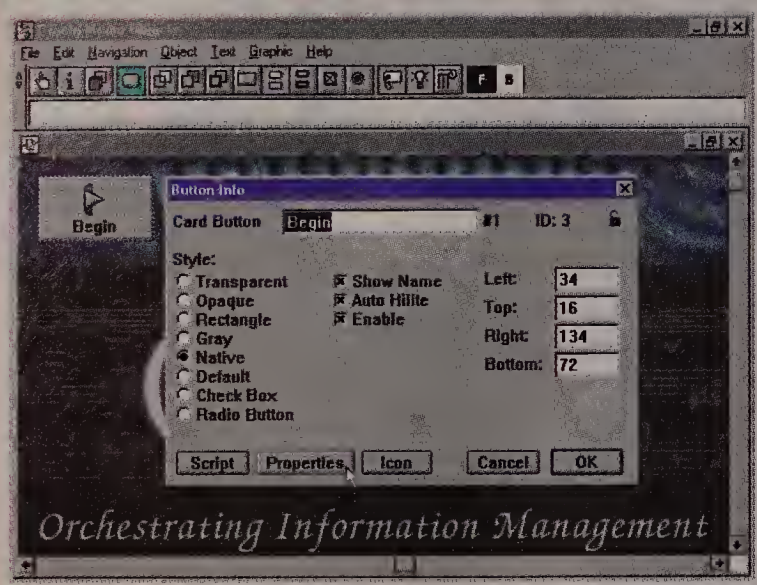
*Automatic SCSI ID selection requires SCAM capable SCSI controller, available in specially priced 8PleX kits.

Circle 179 on reader service card



Oracle Media Objects 1.0

Assembling applications isn't difficult. You switch effortlessly among menus, using a toolbar to access common tasks and dialog boxes for viewing and modifying object properties. A script debugging window furnishes precise control. Media Objects is just right for prototype designers or budding authors, since authors can easily position objects on cards and modify most characteristics without scripting.

The English-like, event-driven scripting language gives extensive control over objects and the environment. You can perform calculations with user-supplied data or draw objects under program control. A script-debugging window lets you work interactively with the script and inspect variables, saving time on searches for logic errors. The package supports DataSheets to display tables of numbers and text, and paths to animate objects.

Basic bit-map painting tools and a core set of transitions are included, but the timing precision and animation effects that Director 5.0 provides are not.

Grade: **B-**

STRATA MEDIAFORGE 2.0

Strata is no stranger to multimedia tools, though the company previously focused on 3-D illustration. MediaForge 2.0 is an easy-to-master object-oriented system that lets you drag and drop media into your presentations. The $1495 product permits you to concentrate on content rather than on programming, while preserving the option of writing scripts to achieve advanced results.

MediaForge's hierarchical metaphor opens with a main project and then descends to scenes below. Like Director 5.0, the software provides a resizable stage for incorporating and designing content, together with a toolbox that is packed with such high-end authoring functions as OLE controls, MCI commands, Rich-Text, menu objects, and graphic elements. Many tools come with helpful flow controls—jump, comparison, wait, and a timer—so you don't have to resort to scripting in MediaBasic (a Visual Basic editor).

You can alter object attributes by using Property palettes to build such things as special effects for graphics that appear in a scene. Options have been included for variables, data entry masks, and related form-building capabilities. But MediaForge lags behind the competition in the level of multimedia precision it provides. Though you can create sprite animations that move along a path, MediaForge's control of AV synchronization falls considerably short of Director's. Not to be left out, Strata offers Internet publishing, using its Mirage technology to deliver MediaForge applications online.

Grade: **B**

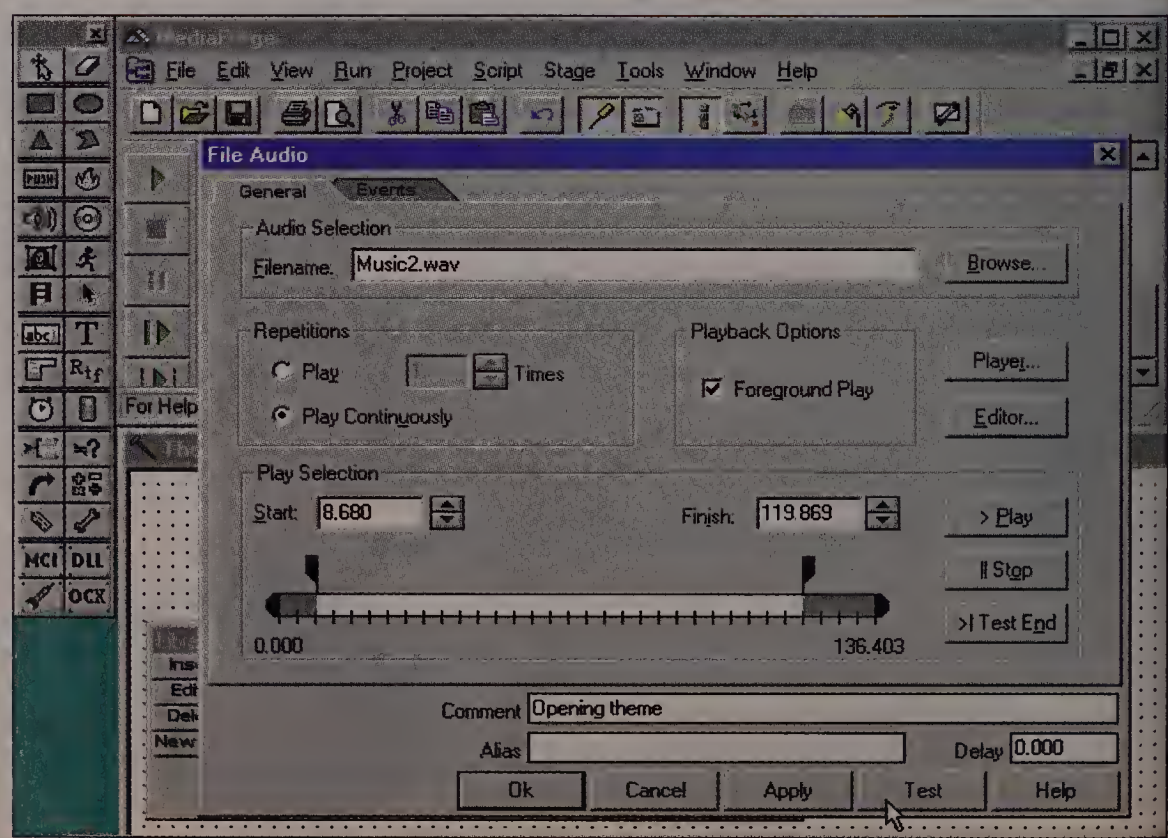
How We Tested

We tested each multimedia authoring software package on a Dell Dimension XPS P133c system running Windows 95. We used Adobe Photoshop 3.0.5 to create the test images, and we used Adobe Premiere to edit video segments.

When creating our test presentation, we evaluated each package's ability to meet the needs of users at various experience levels. First, we examined ease of use and learning, which is increasingly important because users are under constant pressure to complete titles faster. Next, we gauged flexibility, covering such functions as the ability to import and manipulate different multimedia and graphics types. Then we appraised the power and flexibility of the scripting language.

We tested each program's interaction with other Windows applications, such as whether it uses OLE, VBX (or OCX) controls, or other functions (like built-in database connections). Finally, we created a run-time version of our application and determined how easy it was to install on another system. Our final score also took into account a product's affordability and the vendor's support.

Strata MediaForge 2.0



Authoring Packages Turn You Into a Professional Multimedia Developer

● = Yes ○ = No

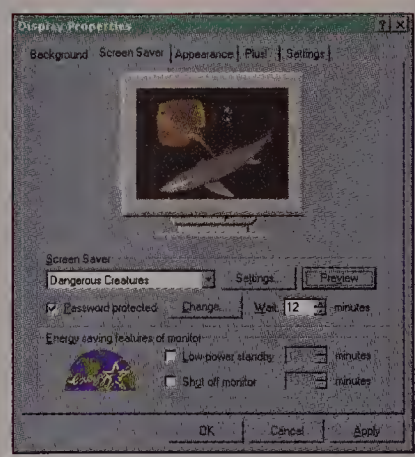
Product	Asymetrix Multimedia ToolBook 4.0	Macromedia Director 5.0	Microsoft Visual Basic 4.0 Standard Edition	Oracle Media Objects 1.0	Strata MediaForge 2.0
Phone	800/448-6543	800/326-2128	800/426-9400	800/633-0687	800/787-2823
Main features					
Street price	$749	$850	$99	$495	$1495
Authoring platform	Windows 3.1, 95, NT	Mac (68K, PPC); Windows 3.1, 95, NT	Windows 3.1, 95, NT	Mac (68K); Windows 3.1, 95	Windows 95, NT
Playback platform	Windows 3.1, 95, NT; Internet	Mac (68K, PPC); Windows 3.1, 95, NT; Internet	Windows 3.1, 95, NT	Mac (68K); Windows 3.1, 95, NT; Pippin, DAVID-based set-top boxes	Windows 95, NT; Internet
Authoring paradigm	book/page	stage/cast	forms/window	card/stack	stage/scene
Supplied editors	script, drawing, bit map, palette	24-bit paint, animation	script	script, 8-bit paint, drawing	script
Database support	Paradox, dBASE III	File Flex Lite	Microsoft Access, Visual FoxPro, Xbase, SQL Server	Oracle7 add-in	OLE controls, MediaBasic scripting
File support					
Graphics	PICT, BMP, DIB, WMF, CGM, DRW, DRF, GIF, PCX, PIC, TIFF, CDR, EPS, TGA, PhotoCD	PICT, BMP, EPS, TIFF, JPEG, DIB, WMF, PNT, MacPaint, GIF, PhotoCD, Scrapbook	BMP, WMF	PICT	BMP, JPEG, TGA, TIFF, WMF, PCT, PCX
Text	ASCII, RTF, TXT, anti-aliased text	ASCII, RTF, TXT	ASCII, RTF, TXT	ASCII	ASCII, RTF
Animation	FLC and FLI; path-based	PICS, FLC and FLI, sprite-based, QuickDraw 3D	FLC and FLI	proprietary format; path-based	sprite engine for path-based animation
Digital video	AVI, QuickTime	QuickTime VR, Video for Windows, MPEG, ActiveMovie	AVI	QuickTime	AVI, QuickTime, MOV, Intel Indeo
Sound	WAV, AIF, MIDI, CD Audio	WAV, SND, AIF, SoundEdit, MIDI	WAV, MIDI	WAV, AIFF, AIFC	WAV, MIDI, CD Audio
Scripting language	OpenScript	Lingo	Visual Basic for Applications	Oracle Media Talk	MediaBasic
Distribution					
Installer utility	●	●	●	○	○
Free run-time player	●	●	●	●	●
CD-ROM optimization	●	●	○	●	○
Netscape Navigator plug-in	●	●	○	○	●
Service and support					
Free support (days)	30	90	30	30	unlimited
Phone support	6am–6pm (PST)	7am–5pm (PST)	6am–6pm (PST)	none	8am–6pm (MST)
Web site address	http://www.asymetrix.com	http://www.macromedia.com	http://www.microsoft.com	http://www.oracle.com	http://www.strata3d.com
Product card no.	769	770	771	772	773

Patrick Marshall and Thomas Marshall

Q I recently read an article describing a shortcut to a password-protected computer screen saver. But what does "password protection" mean?

If I really wanted to bypass a password-protected screen saver, why couldn't I just hit <Ctrl>-<Alt>-<Delete>, then select the appropriate task, and then click End Task?

mjt4941@msn.com
via the Internet



You can't clear the Windows screen saver without issuing a password—or rebooting.

A If a person could bypass a screen saver by the method you give, it certainly wouldn't be password-protected. But give it a try: Call up the Control Panel in Windows, select the Display utility, and then choose the screen saver tab. Next, enter and enable the password. Once the screen saver comes on, try using <Ctrl>-<Alt>-<Delete>. It won't accomplish anything until you've entered the password and cleared the screen saver. The only way around this is to reboot the computer.

Q I have a Packard Bell P75—still configured from the factory. When I try to boot to the command prompt or try to restart the PC in MS-DOS mode, I get the error "Incorrect DOS Version"; then Windows 95 restarts. I have tried remarking everything out of my computer's AUTOEXEC.BAT, CONFIG.SYS, and DOSBOOT.BAT files, but the problem remains. Is there a file or setting I'm missing? All of my friends who have Windows 95 can boot to DOS mode with no problem.

sdod@charlotte.insi.net
via the Internet

A If this is the first time you've run into this problem, the chances are your system is still under warranty. If so, you are entitled to have the service provider correct it. In any case, here's what's going on and how you can probably fix it yourself.

The error message refers to a mismatch between a DOS command and the DOS system files that are running. This can happen with a COMMAND.COM file or another DOS command from a different version of the operating system. It can also happen when a shell pointer (a SHELL= line in your CONFIG.SYS or WIN.INI file, for instance) points to a COMMAND.COM file from another version of the operating system.

Check Windows for the date of the COMMAND.COM file in your boot drive's root directory (C:\) by selecting View/Details. If the date is anything other than 7/11/95, copy the COMMAND.COM file from your Windows directory (provided that it has the right date) to the root directory.

You might also ask your vendor how your system managed to acquire a mismatched DOS command file in the first place. A mischievous application may have copied it there, or conceivably it was left over from a previous installation.

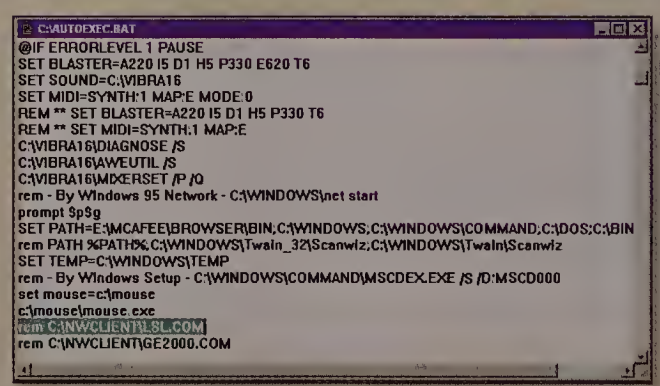
If the date of the file in your root directory is correct but your problem persists, try checking your shell pointers for references to COMMAND.COM files located in other directories in your system.

Q I have the Windows 95 operating system. A couple of months ago I added a new hard drive, which correctly reas-

Solution of the Month

Many people already know about the SYSEDIT.EXE utility, which opens each of your system configuration files in its own editable window. Although you won't find a SYSEDIT icon in any program group or menu, SYSEDIT is included in all current versions of Windows.

The files listed in SYSEDIT differ depending on whether your system is hooked up to a network and MS Mail messaging system. If it is, you'll see the lines shown in the figure at left. If you need to change one of these files manually, never use the Windows Notepad or any other text editor. Instead, always use the SYSEDIT utility, because it automatically creates a backup copy of the existing system file, with the extension SYD. That way, if you subsequently realize that you've made an error, you can restore a previous version of the file.



CONFIG.SYS
AUTOEXEC.BAT
WIN.INI
SYSTEM.INI
PROTOCOL.INI
MSMAIL.INI

Files that you'll find listed in the SYSEDIT. EXE utility.

The SYSEDIT executable is found in the Windows/System directory. Under Windows 3.*x*, I like to place the icon in my Main program group, alongside the PIF editor. Open the Main group, click File/New, and select Program Item. Then click Browse to scan your Windows/System directory for the file name, and double-click to bring the file name back to the Add Program Item dialog box. Provide a Windows name and choose a different icon if you wish; then click OK to finish.

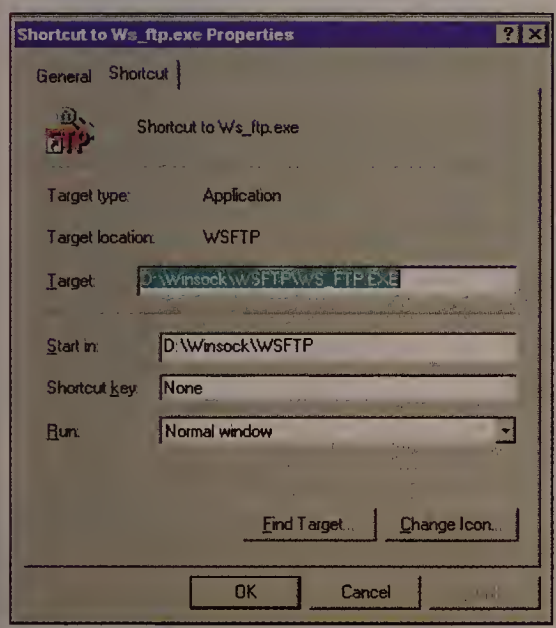
Under Windows 95, the process is simpler: Just click on My Computer, then click Windows, and then click System to locate the file name. Drag the file and drop it on any group to which you want it added.

Thomas Campbell
thomas@netbox.com

signed my CD-ROM drive to drive E. Now when I put a CD in the drive and try to open it, I get the message, "Make sure the CD-ROM is inserted or that you are connected to the correct network drive." The system seems to be indicating that the CD-ROM drive is still the D drive. When I use a disc that I've installed on the D drive (my newer hard drive), I don't have this problem. Your suggestions would be greatly appreciated.

John T. Grieco
john.grieco@magicnet.net

A Evidently you are talking about using applications or shortcuts that you have installed from CD-ROMs to your hard drives to access data or applications that reside on the disc. But whether the application remains on the CD-ROM or has been installed to the hard drive, you access it in the same way—by clicking on an icon that sooner or later activates a pointer to information on the disc. As a result, the two cases are similar, both in causes and in resolution.



The Windows Explorer Shortcut Properties screen shows pointer reference.

The fact that your system works fine with applications that were installed to the newer drive is a good clue. For one thing, we can safely assume that your CD-ROM drive was indeed correctly reassigned to drive E. But the likeliest reason that your more recently installed applications work is that, when their pointers were established, your CD-ROM drive had already been set to drive E. Applications installed earlier still have pointers to a CD-ROM that's supposed to be in drive D, although the drive assignment was later changed.

The solution is simple: If you delete the nonfunctional icon and reinstall the application from the source CD-ROM, Windows 95 will stop looking for the application on drive D (where it was located when originally installed) and instead will try to access it on drive E (where it is now found).

Audio

Q I have a clone PC with a 486DX2 66-MHz processor running Windows 3.11 for Workgroups, and a Sony double-speed CD-ROM drive. When I try to run the Media Player application from the Accessories group to choose CD Audio from the Device menu, it does not appear in the list. When I open the file MPLAYER.INI in the Windows directory, I find the line CDAudio=0 under

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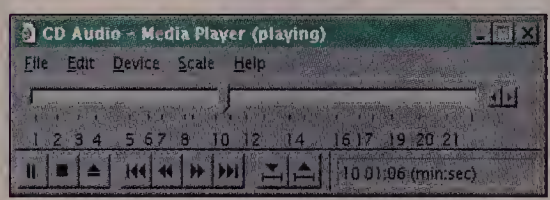
Circle 132 on reader service card

[Devices]. By changing this setting to CDAudio=17 and by saving the file, I arranged for the CD Audio device to be listed in Media Player. But clicking on it to play an audio CD brings up this message: "The MCI device required to play this file is currently not installed on your system. Media Player cannot play this file unless the device is installed." Now, if I go back to Media Player, CD Audio is no longer listed, and I find myself embarking on this nonsensical loop again. I know the required driver is installed, since the system worked fine at first. Why does my system keep dropping the 17 from the MPLAYER.INI file?

James Harris
jeharr@compuserve.com

A You can call a gnat a gnu, but that won't make it grow any larger. Changing the CD Audio entry in the MPLAYER.INI file won't let you play audio CDs if your hardware and drivers aren't set up



The INI file that configures Media Player can change without letting you know, making audio CDs unplayable.

correctly. And the fact that the system's drivers were set up properly in the past doesn't mean that they still are.

The value that appears in the CDAudio= line in the MPLAYER.INI file reverts to zero under certain circumstances. For example, if the drivers for your CD-ROM drive are not loaded when Media Player is launched, the CDAudio= line will reset. Likewise, if you change your SYSTEM.INI file, or if Windows fails to detect the CD player on boot up, the setting in the MPLAYER.INI file will change to CDAudio=0. Finally, with some CD-ROM drives, if you perform either of the above operations without first putting a disc in the player, the MPLAYER.INI settings will revert to their original settings.

The solution: First, reinstall your CD-ROM software. Next, put a disc in the player, making sure that the MPLAYER.INI file reads CDAudio=17, and then see what happens.

Q Do you know of any PCs with speech recognition (voice dictation) that would let me speak into a microphone and have the computer type what I say into a word processor?

Steven Lim
stevenl@inow.com

A Yes, you're in luck: Software now exists that lets you perform exactly the task you describe. Initially you'll have to spend some time training the program to recognize your speech sufficiently well to minimize errors; and with most of the programs, you'll have to train yourself to speak more clearly and with pauses between words. But once you have done so, you'll find that these programs handle the job quite satisfactorily.

If you're using an IBM-compatible PC, your choices include DragonDictate, from Dragon Systems (800/825-5897); Kurzweil Voice for Windows, from Kurzweil Applied Intelligence (800/380-1234); SpeechMagic, from Philips Dictation Systems (415/434-7715); and VoiceType, from IBM (800/825-5263).

The Philips product hadn't yet appeared on the market at press time, but it should be available by the time you read this. It promises to deliver "continuous speech" dictation capabilities, meaning that you should be able to dictate in a natural voice, without taking extra care to space words and enunciate clearly.

Q I recently purchased two enhanced CDs: Stripped, by the Rolling Stones; and a demo of various titles called Spew+. I first tried them at the local computer store on a Power Mac, which correctly ran the multimedia files and played the discs as music CDs. At home, however, neither of my PCs could read the multimedia files. One system is a Pentium Pro 200 running Windows NT, with a Teac 6X EIDE CD-ROM drive. The other is a 486DX-50 running both Windows 95 and Windows 3.1, with a Sound Blaster double-speed CD-ROM drive. The only thing my two systems can see is a plain music CD, without the accompanying video.

I can only assume that this is a drive-specific problem because the different OS and PC platforms yielded mixed results. Why does a certain make of CD-ROM drive have the ability to read files from a disc, while another does not?

Curt Holum
Twin Valley, Minnesota

A Your problem could be a matter of drive incompatibility or of missing software. The first thing you should do is find out whether your systems have the appropriate software installed to run the multimedia elements of the enhanced CD. A check of the Rolling Stones disc in question shows that it uses QuickTime for video display. The Macintosh's System 7 operating system has QuickTime capability built right in, but Windows does not. Consequently, if you haven't installed QuickTime, you won't be able to run the videos. Fortunately, Stripped includes an installation routine on the CD-ROM disc that will put QuickTime on your Windows system.

If your system can't even display the multimedia elements in File Manager or Explorer as file names, the problem is more likely with the CD-ROM drive. Not all such drives are capable of playing enhanced CDs. Many triple- and quad-speed NECs, for example, have trouble

The Rolling Stones' enhanced CD Stripped runs an installation routine that puts QuickTime on your Windows PC.

TECHNOLOGY UPDATE

Fifteen years of microelectronic research makes conventional antennas a thing of the past!

This little box uses your home's electrical wiring to give non-subscribers, cable subscribers and satellite users better TV reception on your local broadcast networks!

by David Evans

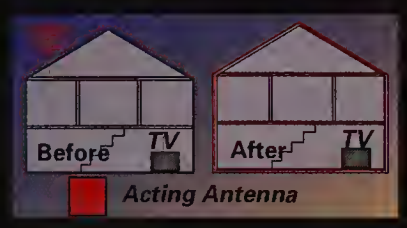
Technology corner

1. Why don't conventional antennas work as well as the Spectrum?

■ When TV signals are tuned at the TV channel's center frequency, optimum tuning has been achieved.

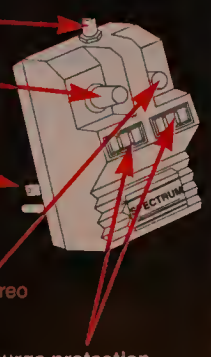
■ Other antennas can't offer center frequency tuning like the Spectrum Antenna can. They only offer such tuning up to the edge of the center frequency. As a result your TV picture remains snowy.

2. How does Spectrum use a home's electrical wiring as an antenna?



Believe it or not, the Spectrum Antenna simply "activates" the giant antenna that already exists in your home. Essentially, it uses all of the wiring throughout your home's walls and ceilings to make an antenna as large as your house for unbelievably clear reception of local broadcasting.

3. Spectrum antenna features



Parallel 75 ohm resistance
For minimum loss of signal

Signal search control
For selecting multiple antenna configurations

Polarized three-prong plug for grounding
For optimum signal grounding to eliminate noise and static

Resonant fine tuner control
For dialing in crisp, clear TV/stereo reception, eliminates ghosting

Dual AC outlets with built-in surge protection
For plugging in additional TV/stereo equipment guarding against damage and electrical surges

Until recently, the only convenient way to guarantee great TV reception was to have cable installed or place an antenna on top of your TV. But who wants to pay a monthly cable fee just to get clear reception, or have rabbit-ear antennas that just don't work on all stations? Some people just aren't interested in subscribing to cable. Or they may live in an area where they can't get cable and TV-top antennas aren't powerful enough. And what about those people who have cable or satellite systems but still can't get certain local stations in clearly?

Now, thanks to fifteen years of microelectronics research, a new device has been developed that is so advanced, it actually makes conventional antennas a thing of the past. It's called the Spectrum Universal Antenna/Tuner.

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How it works. Broadcast TV signals are sent out from the local broadcast station (ABC, CBS, NBC, etc.). They interface with your home's AC power line system, a huge aerial antenna network of wiring as large as your home itself. When the Spectrum Antenna interfaces with the AC line, the signal is sent to its signal processing circuit. It then processes and separates the signal into 12 of the best antenna configurations. These specially processed signals route themselves into 12 separate circuits. The Spectrum Antenna includes a 12-position rotary tapping switch, the "Signal Switch" control, which gathers twelve of the best antenna configurations.

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playing them; and your Teac 6X EIDE drive requires an updated driver to work with enhanced CDs. You can obtain one by calling Teac at 213/727-4860.

Video

Q I have a Pentium-100 with a Number Nine Imagine 128 video card that has 4MB of VRAM. For DOS games, the Imagine card uses only 512K of its video memory, causing the games to run slow and choppy. When running in Windows 95, the card uses all of its memory. Do all programs "Designed for Windows 95" take advantage of my card's full memory capacity? How can I increase my system's video performance in DOS?
Sal Ferre
via the Internet

A The Imagine 128 is a high-performance Windows accelerator. When this video card is functioning in a Windows environment, all graphics are processed through Number Nine's own proprietary graphics processor, and the card uses its full complement of video RAM.

It's a different story when you're running in DOS, however. The proprietary processor shuts down, and all graphics processing is handled by a Cirrus Logic VGA chip (included on the board for this purpose), which can't use the card's Windows-specific extended video RAM.

To improve DOS performance, you could get a better VGA adapter for DOS applications and attach this to the Imagine 128 via the feature connector. First, however, make sure you have enough conventional and extended memory available under DOS. Low memory is a more likely cause of your choppy performance while playing games.

Q Will a 128-bit graphics card with 4MB of VRAM create trouble for games on a Pentium-166, since all games usually run on 64-bit graphic cards. Also, is a Pentium-166 enough for video editing jobs or should I wait for a 180- or 200-MHz unit or even a Pentium Pro?
Joe Tran
via the Internet

A Games might run faster or smoother on graphics adapters that have been designed to have a wider bus width, but they aren't written to run only with cards of a specific bus width. In other words, your 128-bit adapter should be able to run any game program as long as it has the appropriate drivers.

Is a Pentium-166 powerful enough for video editing? Yes. Should you wait for a Pentium Pro? Well, when you're dealing with processor-intensive applications, you'll appreciate that a faster machine makes for easier work; but it also makes for a flatter wallet. Unless money is not an issue for you, look for a computer shop that will let you try out your video editing program on the machines before you buy a system, so you can determine whether the extra performance is worth the extra cost.

Patrick Marshall is research manager for InfoWorld *magazine's reviews and testing department. Tom Marshall is a freelance writer who covers computer technology.*

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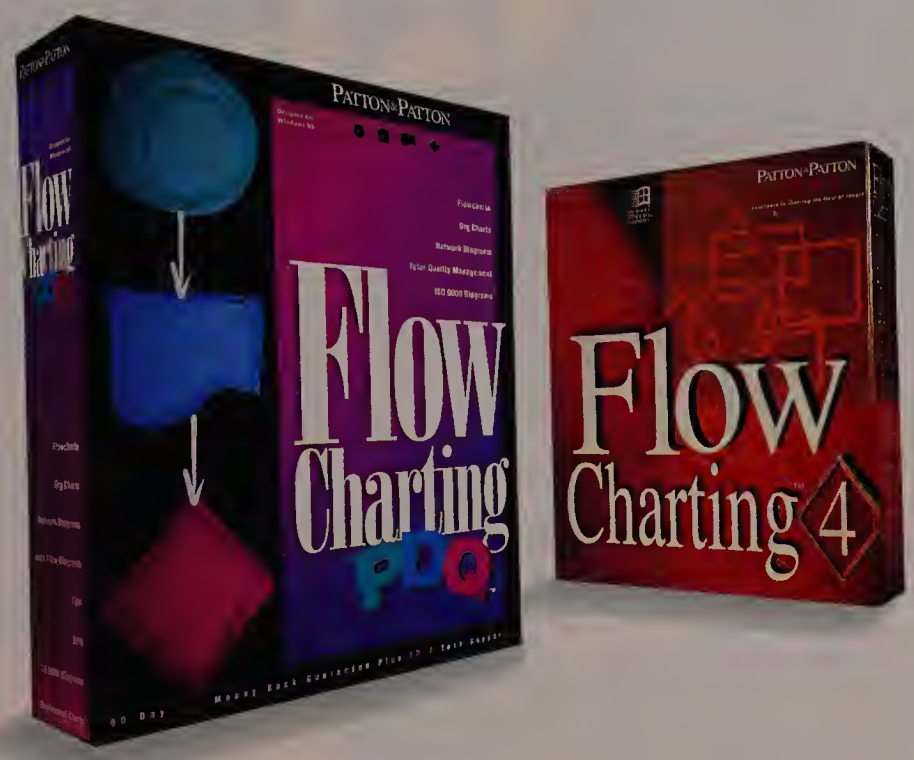

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HELP LINE Q&A

Dial-Up Networking Plus

Q A friend and I each bought the Windows 95 CD-ROM and want to network our two PCs using a modem connection. We'd both like to be able to dial the other's PC, exchange e-mail, and share files. Is this possible?
Keith Fambrough, Louisville, Kentucky

A You bet. Windows 95 offers a handy dial-up networking feature that lets you create a simple network over a telephone line. The only catch is that your copy of Windows came with just half the solution—the client software. If you haven't already done so, each of you should install this software: In the Control Panel, double-click the *Add/Remove Programs* icon, click the *Windows Setup* tab, double-click *Communications* in the Components list, and select *Dial-Up Networking* from the resulting list. Have your Windows 95 CD-ROM handy.

The server software is included in Microsoft Plus, an admirable if costly grab bag of Windows 95 enhancements, but there are rumors that Microsoft may make the server software available at no cost. You may want to set up both machines as hosts; that way either one of you could make the call to the other.

- **Microsoft Plus** list price $54.95; Microsoft; 800/426-9400
  Reader service no. 652

Redirect the Send To Shortcut

Q After installing Windows 95, I swapped my floppy drives so that the 3½-inch drive is A: and the 5¼-inch drive is B:. I moved and rejumpered the drives, switched the floppy controller cable, and reconfigured my CMOS. Now I can boot from the 3½-inch drive, and Explorer and the DOS prompt identify the drive correctly.

But when I right-click an icon and choose Send To, the resulting menu still lists A: as a 5¼-inch drive and B: as 3½-inch. What's going on?
Gerrard Sartori, Goderich, Ontario

A The items in the Send To menu are simply Windows 95 Shortcuts and therefore are static: They don't change with the hardware or programs they point to. To bring your floppy drives' shortcuts up to date, follow these steps:

1. Open Explorer and navigate to the \windows\sendto directory.
2. Right-click the incorrect Shortcut to floppy drive A:, choose *Delete* from the resulting menu, and select *Yes*.

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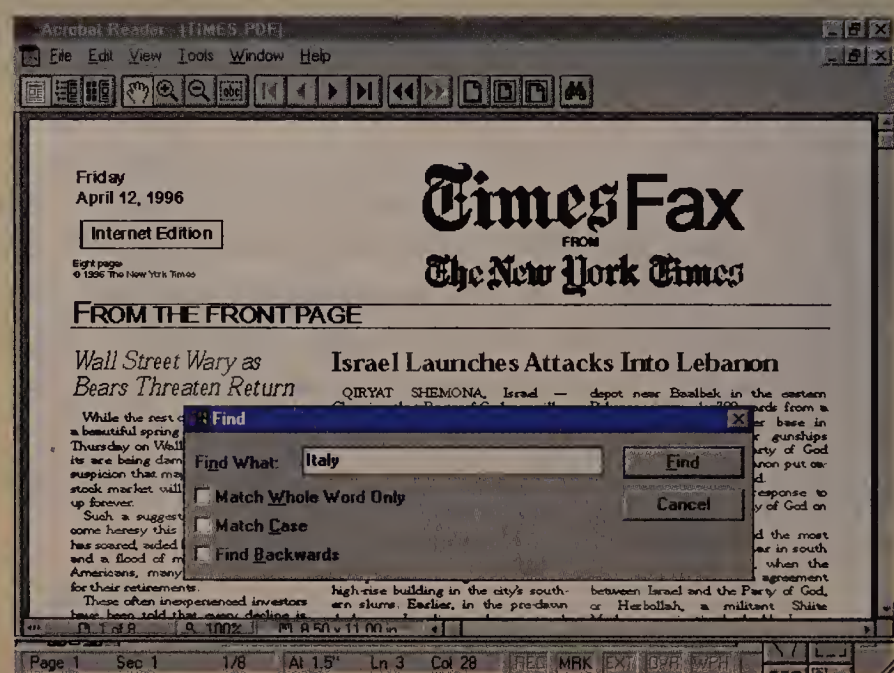

KEVIN CURRY

3. Right-click an open area in the right pane and select *New•Shortcut*.

4. Place a floppy in the 3½-inch drive, type **A:** into the Command line field, and click *Next*, then *Finish*. Windows will create the Send To Shortcut.

Repeat these steps to fix the Shortcut to drive B:, placing a floppy in the 5¼-inch drive in step 4.

Avoiding Quirks in Dir Commands

Q In October 1995's "User Group of the Month," Jan Fagerholm offered a batch file to display the size of files and subdirectories in a directory. It also counts the number of files. But when I compare the batch file's count against File Manager's display of the same directories, the results are off by at least two. The discrepancy is even greater when a subdirectory has subdirectories.
Bruce Yeager, Houston, Texas

A The trouble is that DOS's dir command doesn't differentiate between files and directories. Windows 3.*x*'s File Manager shows the correct number of actual files in each directory, but dir counts each subdirectory as a file. It also counts two other entries as files: '.' and '..', which represent the current directory and the parent of that directory, respectively. And don't forget that while File Manager can be configured to show hidden files, dir skips them by default. (To display just the hidden files, you add the switch **/ah** to the dir command. To display both hidden and nonhidden files, add the switch **/a**.)

Windows 95's dir command solves part of the problem by segregating files and directories in its summary lines. Hidden files aside, using October's batch file under Windows 95 should give you the correct results.

Unfortunately, Windows 95's long file names produce unexpected results. Running the batch file on a directory with long file name entries will litter your screen with the directory listing of every file with a long name that contains a lowercase *t*. To suppress the display of long file names, add **/w** to the batch file's dir command. The corrected batch file should look like this:

```
@echo Reading the directory...
@dir %1 /w /s |find "t" |more
```

Checking File Use in Windows 95

While playing around at the DOS prompt in Windows 95, I found a new file attribute and command line switch for the dir command. The file attribute shows the last date a file was accessed rather than the last date it was modified. When you copy a file, the last modified date does not change, but the accessed date does.

To view both of the attributes, type **dir /v** (*v* is for *verbose*) at the DOS prompt. In addition to the date of last access, the verbose directory (see **FIGURE 1**) gives you both the size of the file and the amount of storage allocated, which is almost always significantly larger because of hard disk cluster size.

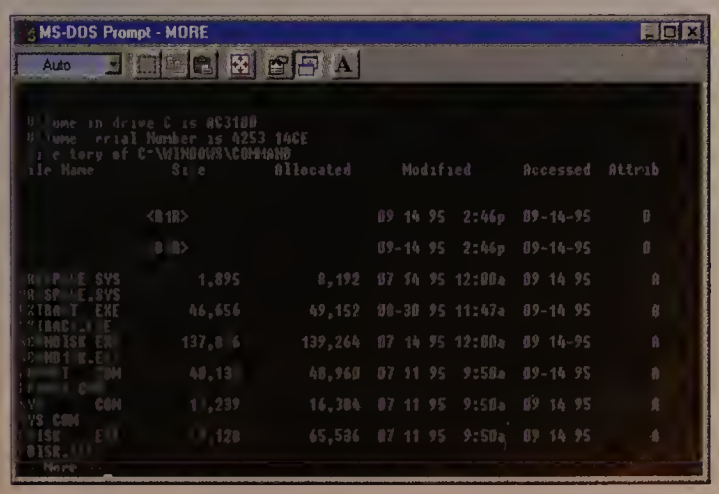

FIGURE 1: FIND THE DATE A FILE WAS LAST ACCESSED IN WINDOWS 95 by using the dir /v command.

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```
:top
echo.|date|find "%1" >nul
if not errorlevel 1 goto %1
shift
goto top
:Sun
rem Sunday's code goes here
goto end
:Mon
rem Monday's commands go here
goto end
:Tue
rem Tuesday's commands go here
goto end
:Wed
rem Wednesday's commands go here
goto end
:Thu
rem Thursday's commands go here
goto end
:Fri
rem Friday's commands go here
goto end
:Sat
rem Saturday's commands go here
:end
```

FIGURE 2: RUN PROGRAMS ON SPECIFIC DAYS when you boot up by having autoexec.bat call this batch file, findday.bat.

I've found a couple ways to use these new features. To locate files you haven't used since upgrading to Windows 95, for possible deletion, type **dir /v /s| find "01-01-80 "** at the root directory of a DOS prompt (there are three spaces between the *80* and the closing double-quote). If you haven't accessed a file since upgrading to Win 95, this command will display it, no matter where it is on your hard disk.

When you return from a day off and want to see if someone used your computer, try this variation: **dir /v /s| find "*mm-dd-yy*"**, where *mm-dd-yy* is a date that you were away. If any files were accessed by booting Windows 95, launching an application, or opening a document, the telltale fingerprints will be readily apparent. Repeat the command for each date you were away.
Kevin Buchan, America Online

If It's Tuesday, It Must Be Defrag

Q Is there a way to set up commands in autoexec.bat so that they execute only on particular days of the week, in carousel fashion? For example, I'd like to scan one hard disk on, say, Monday, a different hard disk on Tuesday, and run different maintenance tasks on Wednesday, Thursday, and Friday. Also, I'd like the one-a-day tasks to run only the first time I boot up each day.
Andrew Struiksma, Lynden, Washington

A Not a problem—the findday.bat batch file in **FIGURE 2** does just what you want by looking for the day of the week returned by the date command and branching to a matching label that contains that day's command(s).

To use findday.bat on your system, create the file using a text editor, replace the 'rem…' lines with your commands, and save the file in your root directory. To activate it, add the line **call findday Sun Mon Tue Wed Thu Fri Sat** to autoexec.bat. Case is important in the parameters; typing tue instead of Tue will send the file into an endless loop.

To keep findday.bat from running more than once a day, use it in combination with the batch file in May's *Help Line* ("One Virus Scan Per Day Is Plenty"). Add the once-a-day code to autoexec.bat, then replace 'rem (antivirus program commands go here)' with the 'call findday…' line in the previous paragraph. To run programs only once or twice a week, remove parameters from the 'call findday…' line. For example, to run only Monday's and Friday's commands, change the line to **call findday Mon Fri**.

Extend Your Notebook's Battery Life

In "Top 20 PCs: Best PCs for Windows 95" (March), *PC World* states that many portables have shorter battery lives under Windows 95 than under Windows 3.1. I've found a way to remedy this on systems with CD-ROM drives, albeit at the cost of a good Windows 95 feature.

Windows 95 expends a lot of power checking the CD-ROM drive every few milliseconds to see if you've inserted a disc. (This is why a disc plays as soon as you pop it in the drive.) To disable this polling, turn off the Auto Insert Notification feature: Right-click *My Computer* on the desktop and select *Properties* from the menu. Click the *Device Manager* tab, and make sure *View devices by type* is selected. Double-click the *CD-ROM* entry to expand it, then double-click the name of the CD-ROM drive that appears. In the Properties dialog box, click the *Settings* tab, and uncheck *Auto insert notification* (**FIGURE 3**). You lose autoplay capability, but it takes a load off the battery.

Windows 95 polls PC Cards too, so remove all unused PC Cards.
Paul Reid, Yorba Linda, California

By Scott Spanbauer

PC WORLD online *The file mentioned in this article is available on PC World Online. Scott Spanbauer is a contributing editor for* PC World *and author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240).* Help Line *welcomes questions and tips and pays $50 for published items.* *See page 14 for information.*

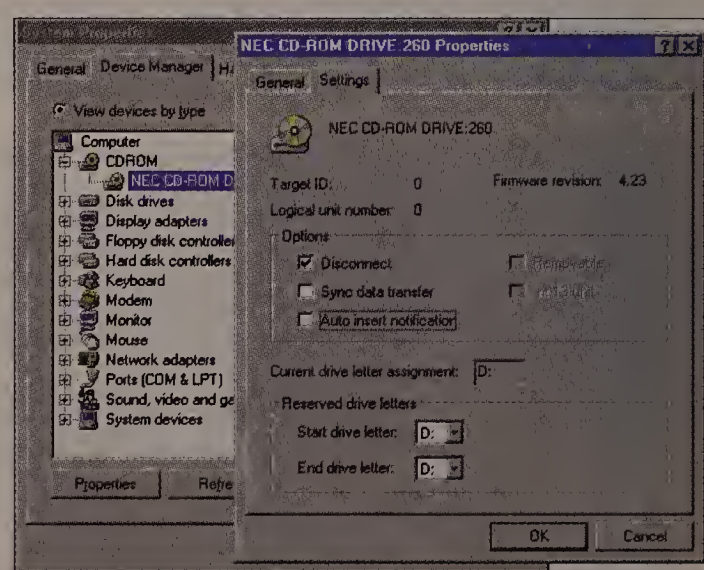

FIGURE 3: WINDOWS 95 WASTES BATTERY POWER by continually polling your CD-ROM drive. You can disable the polling by unchecking Auto Insert Notification.

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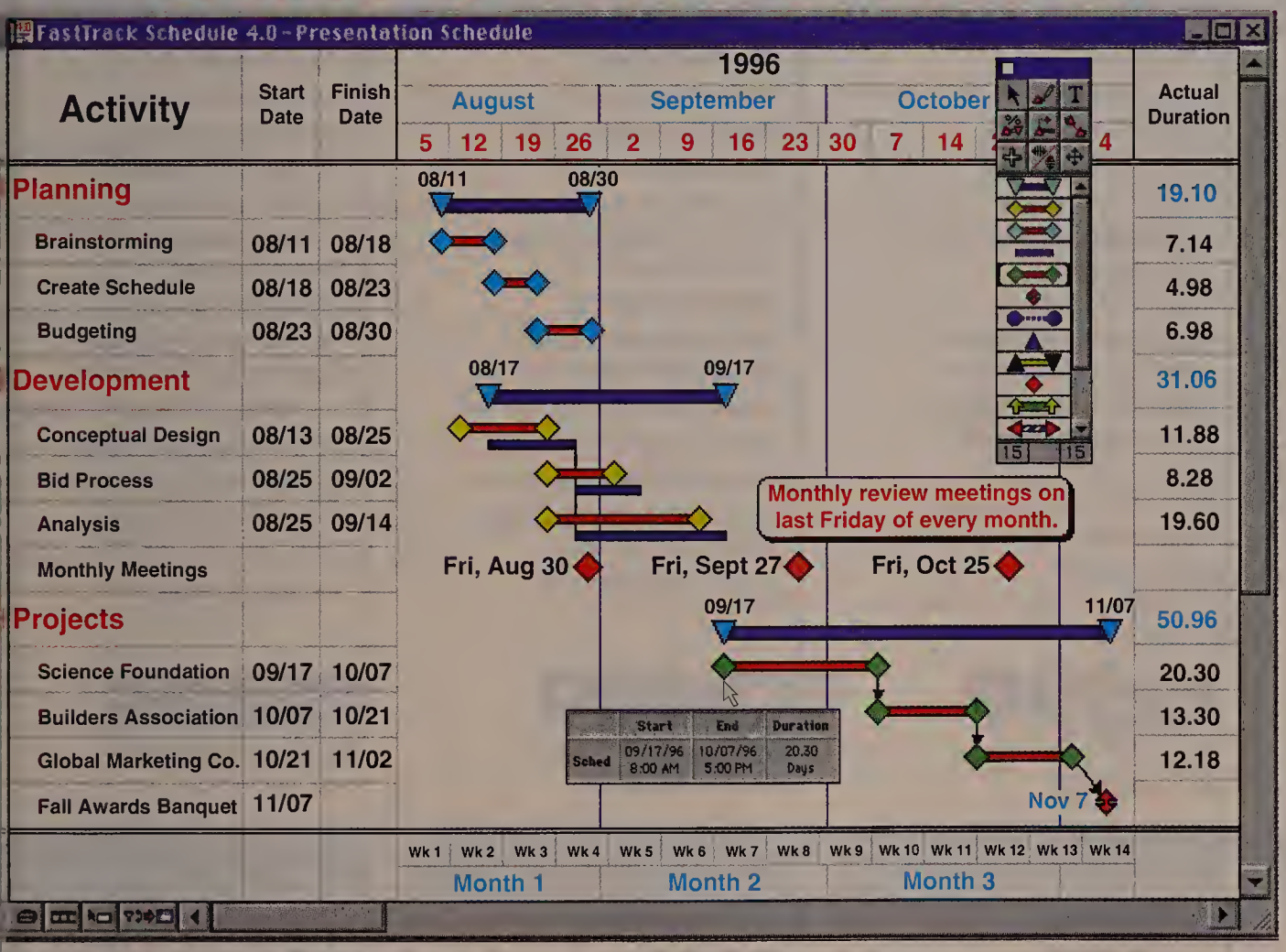

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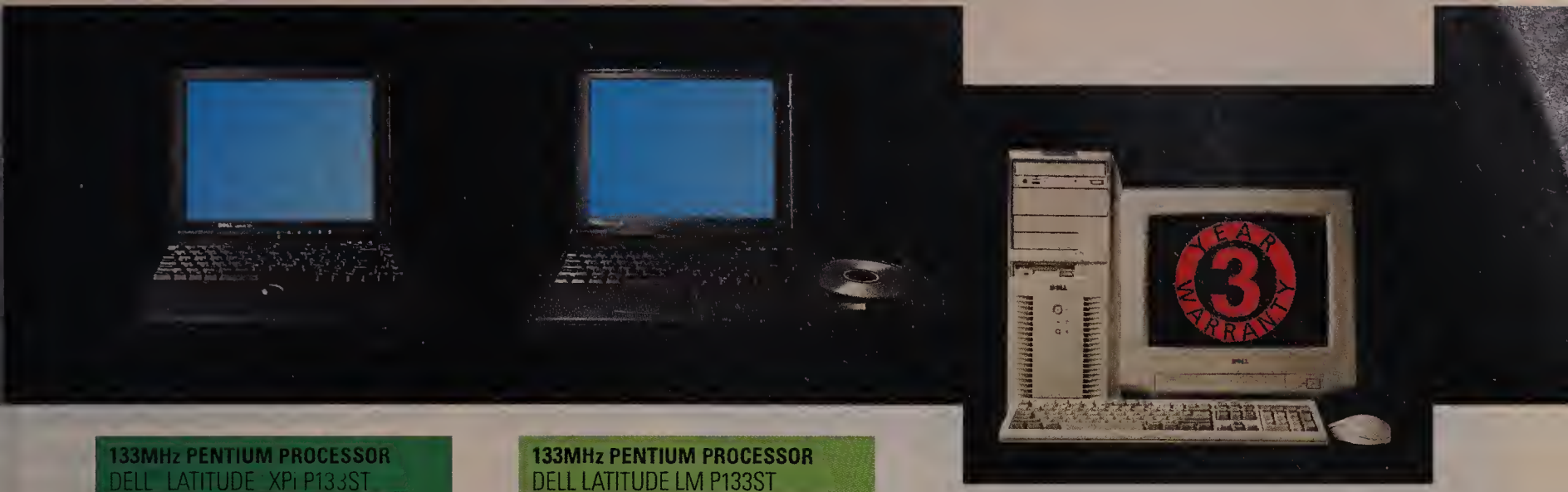

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SPREADSHEETS Q & A

Summarize Selected Data With an Excel Array Formula

Q I've extracted data from our hospital's client-server databases into an Excel workbook, where I use PivotTables to slice and dice the data for a variety of analyses, including patients' median length of stay by physician. The PivotTable lets me calculate the sum or average of groups of records, but I'd like to calculate a median instead. I know about Excel's median() function, but is there any way to make a PivotTable produce medians?

Robyn Nafe,
Winston-Salem, North Carolina

A Strictly speaking, no. PivotTables don't include the range of statistics that worksheet functions offer. However, as is often the case, an array formula can do the trick almost as neatly.

I've constructed a simplified version of the example you sent me. The model's PivotTable determines the average length of stay of each physician's patients. The added array formula utilizes an if() function to select the values to calculate the median.

To set it up, follow the steps outlined below and illustrated in **FIGURE 1**:

1. In a new worksheet, create the database by entering the data shown in range A1:D17.

2. Select C2:C17, then select *Insert•Name•Define*, enter the name **md_code**, and click *OK*. Repeat the process to assign the name **los** to D2:D17.

3. Select any cell in the database, and select *Data•PivotTable* to invoke the PivotTable Wizard. In step 1 of the wizard, click *Next;* in step 2, click *Next*. In step 3, drag the field buttons on the right into position to create the layout shown in the upper-right screen in Figure 1. When you drag the Length of Stay button into the PivotTable, it appears as 'Sum of Length of Stay'. Double-click it, and change its 'Summarize by' setting to Average. Click *Finish*.

4. In the PivotTable sheet, click the *Data* button in cell B1 and drag the mouse to the right (until the icon changes from a vertical table to a horizontal table) to create a separate column for Average Length of Stay.

5. In cell D2, enter the label **Median**. In cell D3, type the formula **=median(if(md_code=A3,1*los,""))**, and press **<Ctrl>-<Shift>-<Enter>** to enter it as an array formula. Copy the formula to D4:D5.

The if() function generates an array of patient lengths of stay for each physician. The median() function then returns the median of those lengths of stay for each physician.

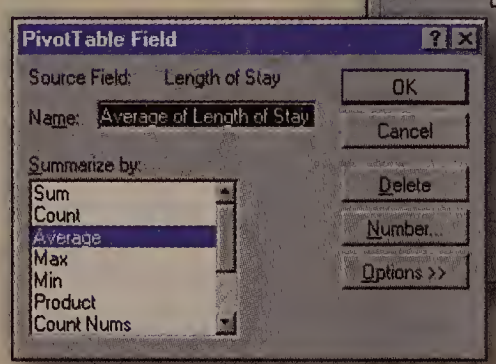
Add Another Column of Statistics to an Excel PivotTable via an Array Formula

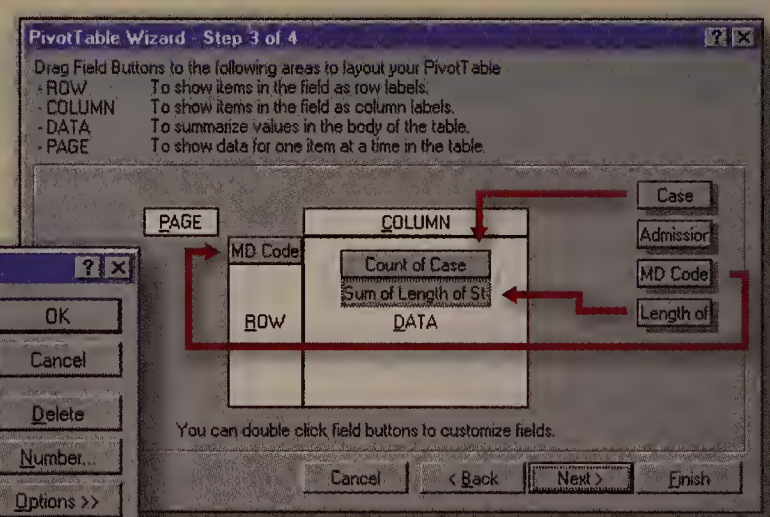
❶ **Create the database.**

❷ **Assign the name md_code to range C2:C17 and assign the name los to range D2:D17.**

	A	B	C	D
1	Case	Admission Date	MD Code	Length of Stay
2	00330	2/27/96	B	4
3	00625	1/13/96	B	10
4	00888	2/5/96	B	3
5	00812	3/14/96	B	5
6	00862	1/11/96	B	0
7	00161	1/27/96	C	3
8	00290	3/5/96	C	10
9	00250	3/24/96	A	8
10	00838	2/3/96	B	6
11	00909	3/5/96	A	0
12	00431	1/5/96	C	13
13	00462	3/7/96	A	5
14	00745	3/23/96	A	12
15	00592	2/5/96	C	4
16	00605	3/24/96	C	11
17	00523	1/9/96	B	7

❸ **Drag field buttons onto the PivotTable layout. Double-click Sum of Length of Stay and change its Summarize by setting to Average, as in the figure below.**





❹ **Click the Data button and drag the mouse to the right (until the Icon changes from a vertical to a horizontal table) to create a separate column for Average of Length of Stay.**

	A	B	C
1	MD Code	Data	
2	A	Count of Case	4
3		Average of Length of Stay	6.25
4	B	Count of Case	7
5		Average of Length of Stay	5
6	C	Count of Case	5
7		Average of Length of Stay	8.2
8	Total Count of Case		16
9	Total Average of Length of Stay		6.3125
10			

❺ **Enter the label Median in cell D2. Type the formula =median(if(md_code=A3,1*los,"")) in cell D3, and press <Ctrl>-<Shift>-<Enter> to enter it as an array formula. Copy the array formula to range D4:D5.**

	A	B	C	D
1		Data		
2	MD Code	Count of Case	Average of Length of Stay	Median
3	A	4	6.25	6.5
4	B	7	5	5
5	C	5	8.2	10

FIGURE 1: EXCEL'S PIVOT TABLES don't calculate a median automatically. You have to add a formula to make them do that.

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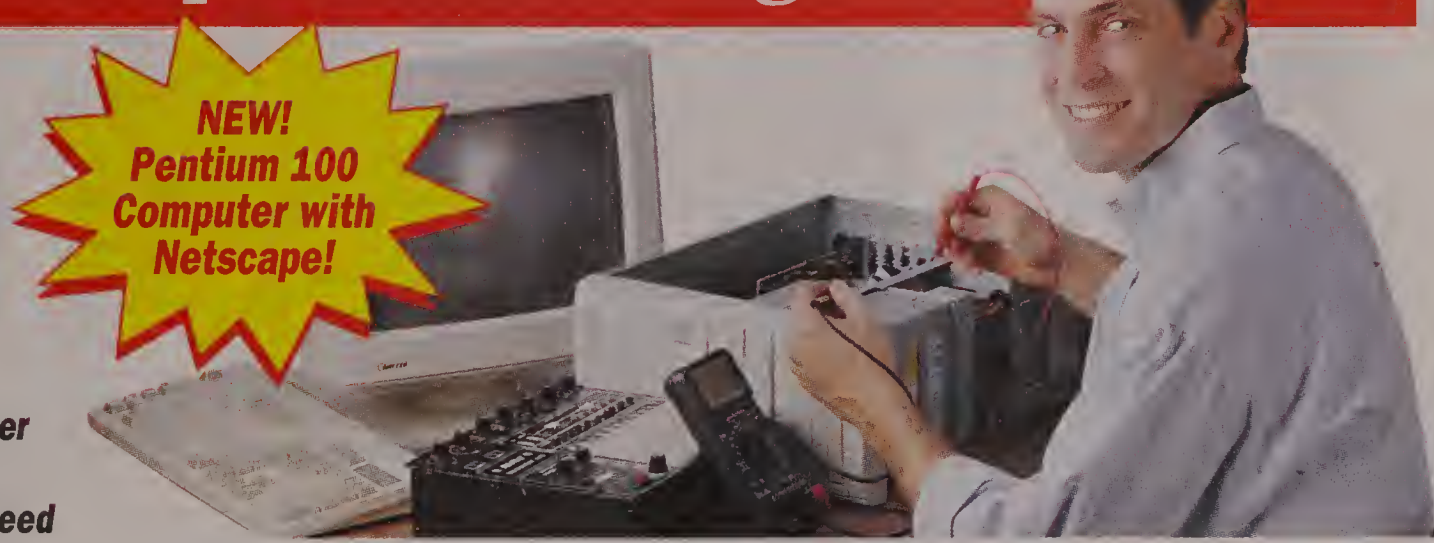

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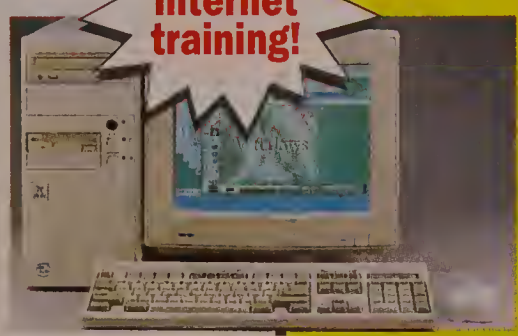

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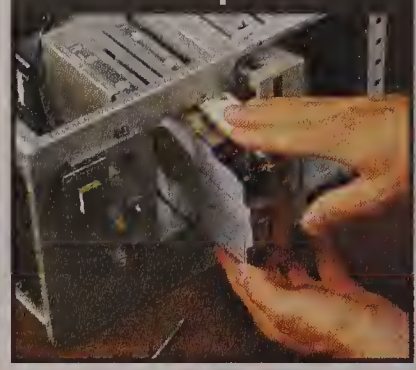

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Card 101

FIGURE 2: LAUNCH A WINDOWS FILE FROM AN ICON by dragging it from File Manager into a Program Manager group.

Opening a Worksheet File From an Icon, in Any Spreadsheet

Q I'm using 1-2-3 release 4 for Windows. When I start the program, I want it to open a particular worksheet instead of bringing up a blank sheet. How can I modify 1-2-3 so that it does this automatically?

Joe R. Young, Babson Park, Florida

A You don't have to modify 1-2-3 at all. Instead—and this works in any Windows application—just drag the file's icon into a Program Manager group window.

In Windows 3.1, first check to make sure Windows knows that .wk4 files belong to 1-2-3: In the File Manager, select *File•Associate*. In the Files With Extension field, type **wk4**. In the Associate With box, you should see '1-2-3 Worksheet'. If you don't, click *Browse*, navigate to your 1-2-3 program directory, and select *123.EXE*. Click *OK* to close the dialog boxes. If you're using Excel, check for the extension .xls; if you're using Quattro Pro, check for a .wb* extension.

Now, with the File Manager still open, restore its window and resize it so that you can see both File Manager and Program Manager on your screen. Locate the worksheet you want 1-2-3 to load, and drag the worksheet's icon out into a program manager group window, as in **FIGURE 2**.

That's it. When you double-click the new file icon, Windows will launch 1-2-3 and open the worksheet, all at once!

Transferring 1-2-3 SmartIcons to Another Computer

Q I've spent a lot of time customizing the SmartIcons on my office copy of 1-2-3. Now I've purchased a computer for home, and I'd like to use the same SmartIcons there without having to re-create them. Can I copy them from one computer to the other?

J. W. Foise, America Online

A 1-2-3 stores SmartIcons in a set of subdirectories in the c:\lotus\123\ programs directory—drawico, graphico, sheetico, and so on. These subdirectories represent the various 1-2-3 environments—drawing, graphing, and worksheet. The toolbars on which these SmartIcons reside are contained in .smi files. The graphic image of a SmartIcon is stored in a .bmp file, and its macro is in a .mac file.

Let's say that you have rearranged the icons in the Default Sheet toolbar and you've added a new button, which you named expense, that opens your expense voucher worksheet. To duplicate this setup on your home computer, you need to copy the files defaults .smi, expense.bmp, and expense.mac from the sheetico directory on your office PC to the same directory on your computer at home. Then select *Tools•SmartIcons* and drag the new icon from the available icons listed on the left side of the dialog box to the current icons that are listed in the middle of the dialog box.

By Richard Scoville

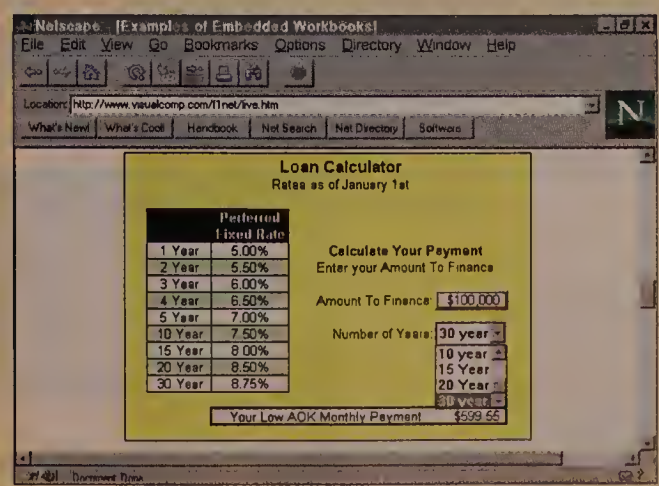
Richard Scoville is a contributing editor for PC World *and a software training consultant based in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

Spreadsheet Toolbox: Put Worksheets on the Web

Imagine a World Wide Web page that contains a live multipage spreadsheet. Visitors to the page could enter their own data to calculate loan payments, portfolio yields, health statistics, and so forth, and see the results instantaneously, complete with charts. They could print or even save the resulting worksheet. Companies could use a tool like this on their intranets.

Stop imagining. Formula One/Net Pro, developed by Visual Components, is a Netscape Navigator plug-in that lets you do all of this.

Head to the Visual Components page (http://www.visualcomp.com/) to purchase Formula One/Net Pro for $39. If you want to include back-end database connections to your worksheet, you'll have to buy the full developer's version for $249 (call the company for more information). Build your worksheet, install it on your Web server, and embed it on a Web page with a few lines of HTML code. To view your creation, users must download the free viewer-cum-spreadsheet program Formula One/Net, and they must be running Navigator and Windows 3.1, 95, or NT. Formula One/Net Pro is available from Visual Components at 800/884-8665, 913/599-6597 (fax). Reader service no. 651



WORD PROCESSING Q & A

Change WinWord's Page Number Defaults

Q Word for Windows lets you insert page numbers easily by selecting the Insert•Page Numbers command, but by default the numbers print at the bottom right, including the first page.

In my documents, I like the first page to be unnumbered and the numbers on subsequent pages to be centered at the bottom of the page. I can specify this in the Page Numbers dialog box, but how do I make these settings the default?

Mark Knutson, Bellingham, Washington

A Unfortunately, you can't alter the default settings for the Page Numbers dialog box, but I can show you how to add an item to Word's Insert menu that will do what you want, bypassing the dialog box altogether. Below and in **FIGURE 1** are the steps for doing this in either Word 6.0 or 7.0. Adding a menu item takes a few minutes, but once you've done it, the new item is always available. (You can follow a similar procedure to set up custom menu items for just about any Word dialog box or command.)

1. In a new document, select *Tools•Macro*, then select *Record* in the Macro dialog box.

2. In the Record Macro dialog box, type **CenteredPageNumber** in the Record Macro Name Field, type **Sets up page numbers, centered at bottom** in the Description box, then click the *Menus* button.

3. In the Customize dialog box, you'll see your new macro name in the Commands list. Click the arrow next to the *Change What Menu* box, then select *&Insert* from the drop-down list, and click *Add*. There's no need to change any other settings in this dialog box, so click *Close*.

4. In the document, select *Insert•Page Numbers* and change the settings in the Page Numbers dialog box to suit your preferences, then click *OK*.

5. Click the *Stop* (left) button on the Macro Recorder toolbar to finish the job. Word will automatically save the macro you just created and the new menu item in the normal.dot template so that it will be available in all your new documents.

6. To insert preformatted page numbers in a document, just select *Insert* and choose your new menu item, *CenteredPageNumber*.

Record and Add Your Own Page Numbering Command to WinWord's Menu

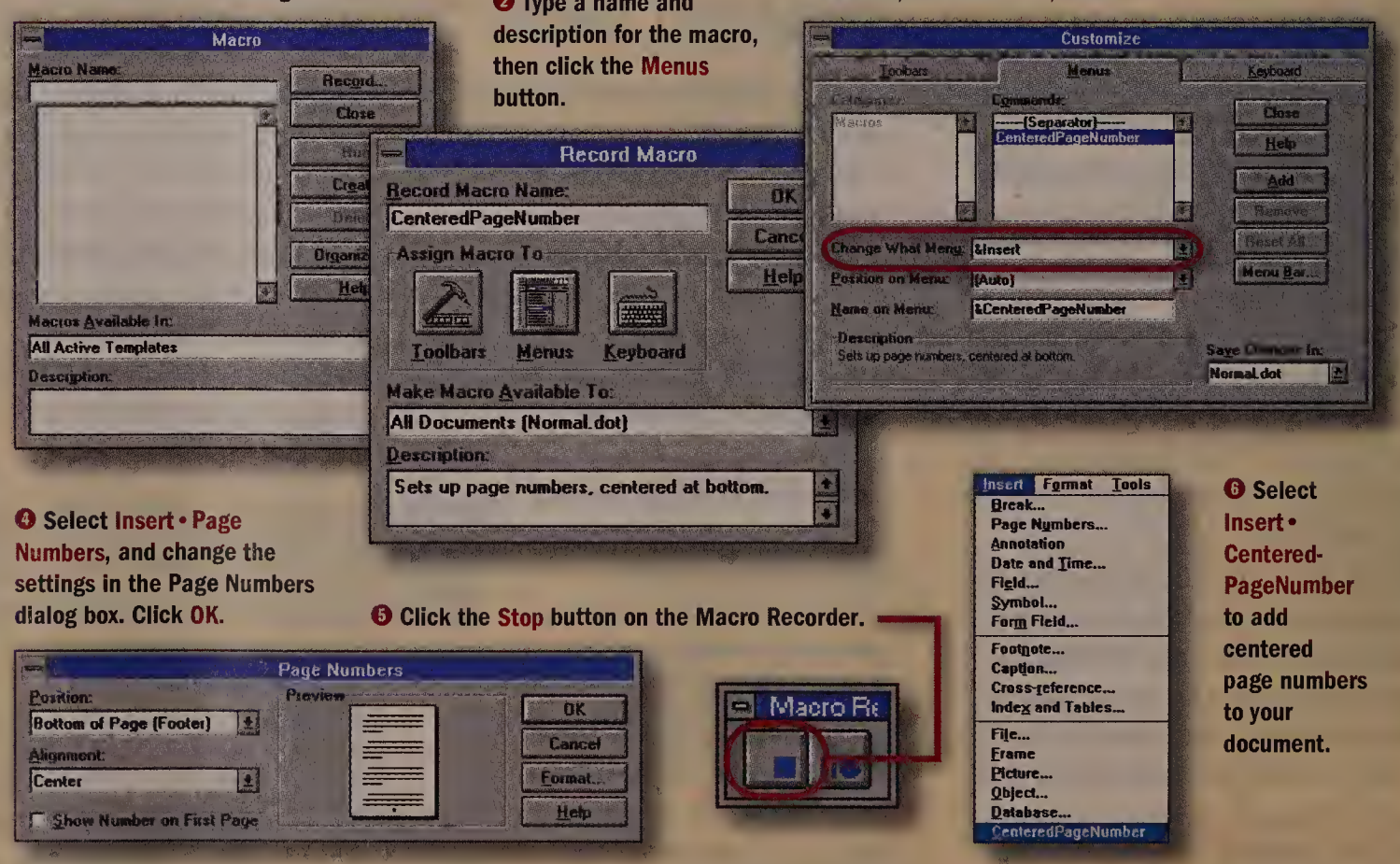


FIGURE 1: RECORD THE STEPS FOR CHANGING WORD'S PAGE NUMBERING DEFAULTS in a macro and add it to the Insert menu. The steps shown here, which work in Word 6.0 and 7.0, will center the page number on the bottom of the page.

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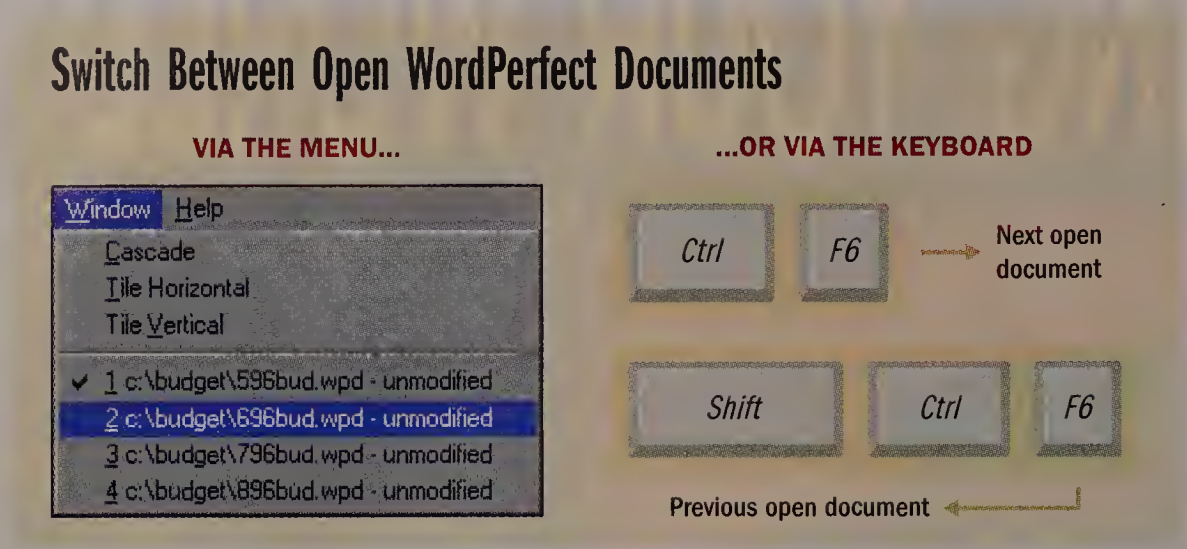


FIGURE 2: INSTEAD OF SELECTING AN OPEN DOCUMENT FROM THE WINDOW MENU (left), keep your hands on the keyboard and use the shortcuts on the right.

Quickly Switch Between Open Documents in WordPerfect 6.1

Q How do I quickly switch among my open documents in WordPerfect 6.1 for Windows? Selecting them from the *Window* menu is time-consuming and takes my hands off the keyboard.
Dan Slabaugh, Tempe, Arizona

A You might have trouble finding the keystrokes for document switching in WordPerfect's help system, but they do exist (see **FIGURE 2**). To switch to the next open document, press **<Ctrl>-<F6>**. To switch to the previous open document, press **<Shift>-<Ctrl>-<F6>**. That's all there is to it. Unfortunately, this doesn't work if you're running WordPerfect 6.1 under Windows 95.

8MB Not Enough in WordPerfect 5.1+ for DOS?

Q I use WordPerfect 5.1+ for DOS with the included ScreenExtender software. It usually works fine, but when I press <Shift>-<F7> to preview my printout, I get the error message 'Not Enough Memory'. My computer has 8MB of memory. Isn't that enough?
Joyce Asfour, Cincinnati

A Even though your PC has 8MB of memory, DOS programs running on it typically are limited to just the first 640K. When you use the ScreenExtender software, it installs itself in memory before you load WordPerfect, using up some of that 640K. Since the Print View function needs still more, you're just flat running out of memory.

There is something you can try, though: If you're using DOS 6.*x* without a third-party memory manager like QEMM, type **memmaker** at the DOS prompt after rebooting your computer. The MemMaker program, which is included in DOS, will attempt to move into high memory drivers and other programs that load when you start your PC, leaving more conventional memory for programs such as WordPerfect.

Just follow the prompts on the screen and let MemMaker do its job, then try ScreenExtender and WordPerfect again. If MemMaker has freed enough memory, your Print View will be fine. This might not work for you, but it's worth checking out.

(Un)formatted Glossary Entries in Ami Pro

Q I often use the Glossary feature in Ami Pro 3.1 to insert boilerplate text in my documents. Sometimes I want that text to be formatted—for example, I may want one line centered and the next left-aligned. But this formatting is lost when I insert it into the Glossary. Am I missing something?
David B. Evans, Clarksville, Arkansas

A Unfortunately, Ami Pro 3.1's Glossary feature can only store unformatted text, unlike Microsoft Word's more capable AutoText feature. AutoText can store graphics and tables, as well as formatting information.

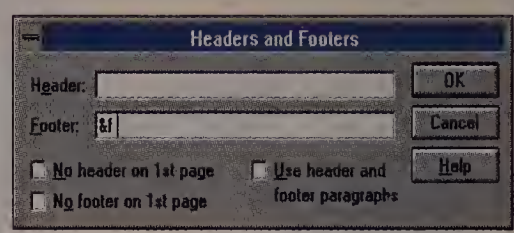
There's good news, though: Word Pro, Lotus's upgrade for Ami Pro, can handle fully formatted Glossary entries.

Add File Names to Works 3.0 Footers

Q I use Microsoft Works 3.0 for word processing, and I'm trying to get it to print the file name for the current document at the bottom of each page. I can do it manually, but that takes a lot of time. Is there an automatic method, or do I need a more powerful program?
Leon Gaumond, Jr., Indian Orchard, Massachusetts

A If the word processor in Microsoft Works does everything you need, there's no reason to upgrade. Just follow these steps to insert a file name in the footer of your Works documents:

1. Select *View • Headers and Footers.*
2. In the Headers and Footers dialog box, type **&f** in the Footer box, as in the figure below. This tells Works to center the file name at the bottom of each page. If you want to left-align the file name, type **&l&f** instead. To right-align the file name, type **&r&f**.



3. Click *OK.*

You can also include plain text in footers, or insert codes for other items such as the page number and the date. Click *Help* in the Headers and Footers dialog box for these codes.

You can see your footer while editing your document: Select *View • Page Layout* to switch to Page Layout mode, or select *File • Print Preview.*

By George Campbell

George Campbell is a contributing editor for PC World *and a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Word Processing *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

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WINDOWS Q&A

Figure Out the Windows 95 Shell Game

Q I accidentally set my Windows 95 shell to Program Manager. It's not messing up my system; I just want to get the Start menu back. Can you tell me how to do that?
John Scaduto, Internet

A Simple. First, take the usual precaution of making a backup of the system.ini file in your Windows folder, just in case anything goes wrong. Then double-click *system.ini* and open it in a text editor. Find the line that reads shell=progman.exe and change it to read **shell=explorer.exe**. Save the file and restart your computer.

If the shell= line in system.ini already points to explorer.exe, chances are you merely have a Shortcut to Program Manager in your Start menu. That's also easy enough to fix.

Right-click the *Start* button and choose *Explore* or *Open*. Make your way to the Start Menu\Programs\StartUp folder and then delete the Program Manager Shortcut.

Speed TrueType Fonts in Windows 3.x

Q I use a PostScript printer at work, but my boss has a large collection of TrueType fonts he wants me to use when formatting documents. It takes longer to print these documents than when I use the printer's built-in fonts. Is there a way I can speed up printing for these TrueType-laden documents?
Sherry Wynn, Tulsa

A Probably. If your documents use a lot of TrueType fonts in large point sizes, you can improve printing time and use less printer memory by sending the fonts to the printer as Adobe Type 1 fonts (the format used to download PostScript fonts).

Open Control Panel and dig through a gazillion dialog boxes: Double-click the *Printers* icon and select your PostScript printer (if it isn't already selected). Click *Setup*, then *Options*, then *Advanced*. For 'Send to Printer as', choose *Adobe Type 1*. With this setting, your printer driver will send fonts to your printer as bit maps for small point sizes and as scalable outlines for large ones. These outlines lack the bit maps' *hinting* (special algorithms for improving the look of fonts at specific resolutions), but this omission usually isn't noticeable at large sizes.

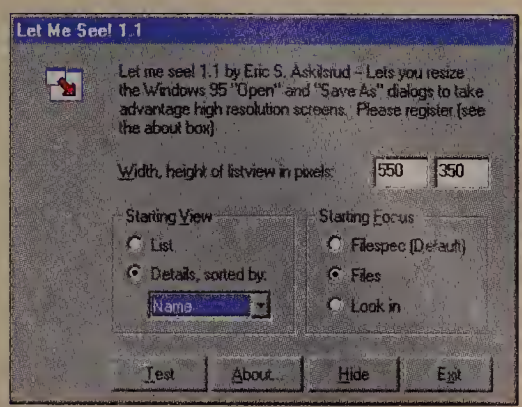
If you're really adventurous, you can adjust the threshold at which the driver makes this distinction. To do that, first make a backup of the win.ini file in your Windows directory. Then double-click *win.ini* to open it in a text editor like Notepad.

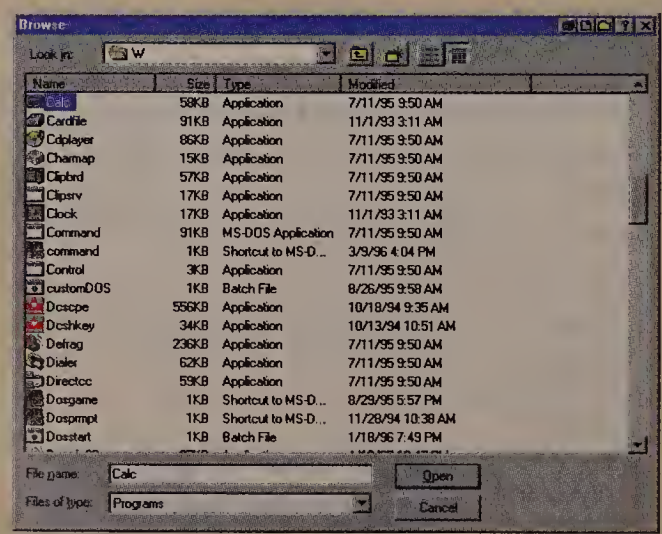
Now find the section of win.ini that deals with your printer. It will have a heading with your printer model and port (separated by a comma) in brackets—for example, '[Apple LaserWriter II NT,COM2]'. Underneath, add a line like this: **minoutlineppem=101**. (Be sure to use this setting, and not the misspelled version found in the printers.wri file that comes with Windows.) The default point-size threshold setting is 101.

Choosing a lower number uses less printer memory because the driver sends a single outline font to the printer for more point sizes. If you reduce the number to 0, for example, the driver will send only outline fonts and no bitmapped fonts. On the other hand, increasing the value uses more printer memory because the driver has to send one bit map for each point size you use. But the advantage is that because of the hinting, the bitmapped fonts may produce a higher-quality rendition of your TrueType fonts.

Save win.ini and restart Windows. Assuming that most of the pages you print use a similar number of fonts, you can run a few test pages at different settings to determine the best threshold for your printer's memory to optimize print time and quality.

Windows Toolbox: Opening a Dialog–Wide Open





Windows 95's common dialog boxes are a great way to do file management on the fly while opening and saving documents. But why does the window have to be so small? Let Me See, a shareware application from Eric S. Askilsrud, expands the common dialog boxes to any size you set. In addition, you can customize the boxes to automatically open in Details or List view with files sorted by name, size, file type, or date modified. This is a great upgrade of Windows 95's interface, and it costs you only $5. It's available as lemmesee.zip on PC World Online and other online services.

Now

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Be Half Way

"Just checking in. What's new at home?"

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Around The World

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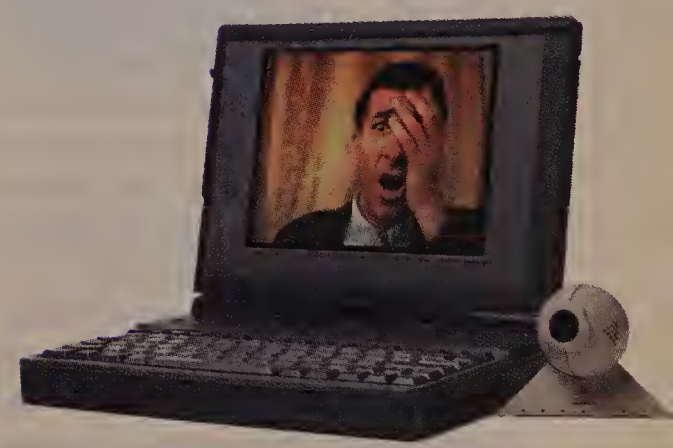

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Point Your Mouse in the Right Direction

Q I have a Microsoft mouse, which I set to the highest possible speed. Unfortunately, every time I restart Windows 3.*x* my mouse goes back to the slowest speed setting. What's going on here?
Ted Bacon, Houston, Texas

A Another fine mouse you've gotten yourself into—or rather, another fine mouse.ini. Microsoft mouse software versions 8.0 and 8.1 come with a utility called point.exe. If you use this program to tweak your mouse, it may be saving your settings to a different mouse.ini file than the one your mouse driver is reading.

To ensure that both are working from the same .ini file, start Windows Notepad and open the autoexec.bat file in your root directory. Add the line **set mouse=c:\mouse** (adjust the path to fit the location of your mouse software). Save the file and restart your computer. From now on, point.exe and your mouse driver should read from the same .ini file.

Tips for Using CD-ROMs in Windows 95

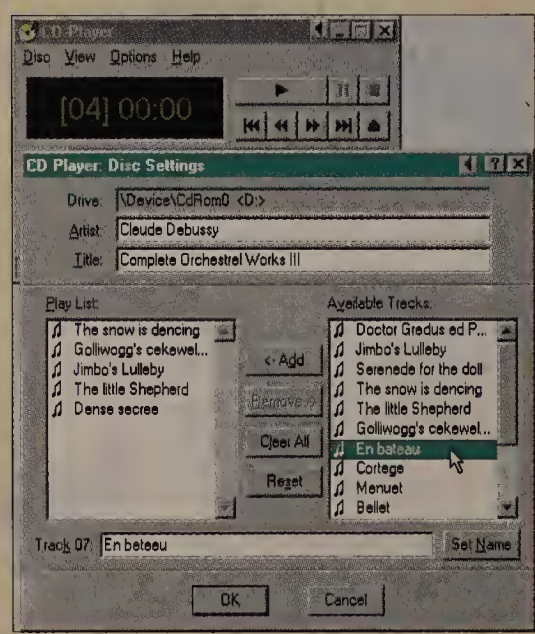
Who can live without a CD-ROM drive these days? Not me. Here are some ways to get the most out of yours in Windows 95:

Put AutoPlay on hold. Audio CDs and CD-ROMs that use Windows 95's AutoPlay feature start an application (such as an installer or option screen) or play an audio CD as soon as you pop in the disc. To override that feature for a single disc, press the <Shift> key as you insert your CD, holding it down while the CD indicator light is on.

Put AutoPlay under. If you don't want a CD to start doing things without your permission, turn off AutoPlay permanently. Right-click the *My Computer* icon on your desktop and choose *Properties*. Click the *Device Manager* tab and make sure the *View devices by type* button is selected. Click the + sign next to 'CDROM' to reveal one or more branches showing your CD-ROM drive(s). Select your drive and then click the *Properties* button. Click the *Settings* tab and uncheck *Auto Insert Notification*. Click *OK* and close the remaining dialog boxes.

Change the drive letter. Don't like the drive letter Windows assigns to your CD-ROM drive? No problem. Open your drive's Properties sheet to the Settings tab as described above. Then change each of the letters in the 'Reserved drive letters' section and click *OK*.

Make a playlist. Don't settle for the same old tunes in the same old order. In Windows' CD Player, choose *Disc • Edit Play List* to type in the names of the selections on your disc and set up a custom order to play them back. The next time you insert that disc, CD Player will recognize it and restore your custom names and playlist.



ARRANGE YOUR OWN MEDLEY with Windows 95's CD Player. It remembers the selections you enter for each audio CD and lets you build a custom playlist.

Cache In. Make sure Windows is caching your CD-ROM drive for optimum performance. Right-click *My Computer* and choose *Properties*. Click the *Performance* tab, then click the *File System* button. Click the *CD-ROM* tab and make sure the 'Optimize access pattern for' setting is appropriate for your drive's speed. And while you're there, try a larger supplemental cache size to get the most out of multimedia.

Cleaning Up After Windows 95 Installation

Q I have a folder on my hard disk called wininst0.400 that appears to have been created during Windows 95 installation. I couldn't find any reference to it in my user manual. Can you tell me if this folder must remain on the hard drive?
Steven M. Brake, PC World Online

A When you install Windows 95 from a DOS prompt, the setup program creates wininst0.400 as a temporary folder during the installation process. If the installation is interrupted, lines are added to your autoexec.bat file that are supposed to detect a certain file in wininst0.400 and advise you to use the Safe Recovery option of Windows 95 setup. You get this warning only once, so if you disregard it and use different installation options, wininst0.400 may stay on your hard disk.

Once you've successfully installed Windows 95 and have no need to reinstall it, you can safely delete the wininst0.400 folder.

Adding a New Password for the Windows 95 Screen Saver

Q In Windows 3.11, I could delete an unknown screen-saver password in the control.ini file. Is there a similar process for Windows 95?
Edward Boyd, Internet

A The screen saver in Windows 95 is intended only to provide privacy for whatever is currently on your screen; it's not intended as a serious security system (neither is the screen saver in Windows 3.*x*, for that matter). So you don't have to remember your old password when you change to a new one.

Just right-click the desktop, choose *Properties*, and click the *Screen Saver* tab. Make sure *Password protected* is checked and click *Change*. Then type a new password in each box and click *OK*. Windows couldn't care less what your old password was. If you forget your old password after the screen saver is running, you'll have to reboot your PC before making this change.

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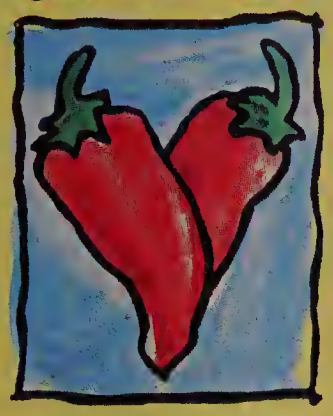

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This state of affairs does lend itself to office shenanigans: Someone who wants to see your work can change your password when you're not around, then get access to your screen the next time you leave, even if your screen saver is running. The best solution is to password-protect Windows itself.

Choose *Start•Settings•Control Panel* and double-click the *Passwords* icon. Click *Change Windows Password*. If you receive a prompt to let you change other passwords at the same time, check the items you want to change and click *OK*. In the next window, type your old password (or leave the box blank if you don't have one) and type your new password twice. Any items (such as the screen-saver password) that you checked in the previous window will now have this password. Click *OK* and close the remaining dialog box. If you forget this password, you'll have to delete files with a .pwl extension in your Windows folder and then set up all Windows passwords again.

As you've probably guessed, this strategy is none too foolproof. For real workstation security, you'll need to invest in additional software or switch to Windows NT.

Show Icons for Windows 3.x System Files

Q How do I get Windows 3.1 to display an icon for all the system files (autoexec.bat, win.ini, and so on)?
Scott Mabel, Internet

A You don't see an icon for these files because Windows doesn't trust you with them: One false change, and Windows could behave unpredictably or even fail to start. Windows 3.*x* does include a System Configuration Editor, but you must create the icon yourself.

In Program Manager, choose *File•New*. Select *Program Item*, and click *OK*. In the Description box, type **System Editor**. In the Command Line box, type **c:\windows\system\sysedit.exe** (your path may differ). If you prefer, you can click *Browse* and locate and select the sysedit.exe file in Windows' System directory. Click *OK* to close the Program Item Properties dialog box. When you double-click your new icon, you'll be able to edit autoexec.bat, config.sys, win.ini, and system.ini. If you use Windows for Workgroups, you'll also be able to modify protocol.ini, msmail.ini, and schdplus.ini.

Get a CLN Bill of Health in Windows for Workgroups 3.11

Q My Windows for Workgroups 3.11 directory has some files with the .cln extension—protocol.cln, system .cln, and win.cln. What are they for?
Harriet Hartvigson, Eugene, Oregon

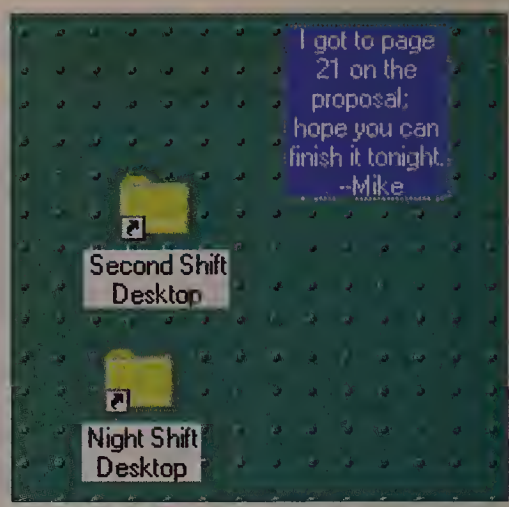
A These are "clean" versions of three Windows configuration files (protocol.ini, system.ini, and win.ini); they are placed on your hard disk during installation. If Windows for Workgroups 3.11 is working fine now but later has problems after you change some setting, you could restore Windows to its previous healthy state by copying these .cln files over the corresponding .ini files.

But relying on these pristine files isn't always the best way to go. If you've made a lot of changes to your system since installing Windows for Workgroups, many of those changes will be wiped out when you copy the .cln files over the .ini files. Moreover, some applications may lose their configuration information or even fail to function at all.

So try this instead: Get into the habit of making backups of all your .ini files (include .grp, .reg, and .dat files while you're at it) before installing any software or doing major customizing. You may want to save each group in a directory named for the application you install or on separate floppy disks. Then if you have problems, you can revert to the most recent backups rather than returning all the way to square one.

More Fun With Sticky Notes

I have discovered a useful extension of a tip that you discussed in the April *Windows* column ["Writing Sticky Notes in Windows 95"]. If the computer is set up for multiple configurations (for different users), you can place sticky notes on the desktops of the other users. First create a Shortcut to the other person's desktop. The path to the other desktop would be **c:\windows\profiles***name***\desktop**, where *name* is the other user's log-on name. Then create a sticky note and drag and drop it on the Shortcut. The next time that person starts the computer, the sticky note appears on their desktop. [See the figure above.]
Francisco J. Aguero, Del Rio, Texas



DRAG AND DROP A STICKY NOTE onto a Shortcut to another desktop. When the person who uses that desktop logs on, your message automatically appears.

Editor's note: Thanks for the great tip, Francisco! The easiest way, of course, to make a Shortcut to the desktop of someone who uses a different configuration of the same computer is to use Explorer or My Computer to locate the Desktop folder, as Francisco describes above. Next, click the Desktop folder to highlight it, and use the right mouse button to drag it to your own desktop, drop it, and then choose *Create Shortcut(s) Here.*

By Scott Dunn

PC WORLD online *The files from this article are available on PC World Online. Scott Dunn is a contributing editor for* PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444).* Windows *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

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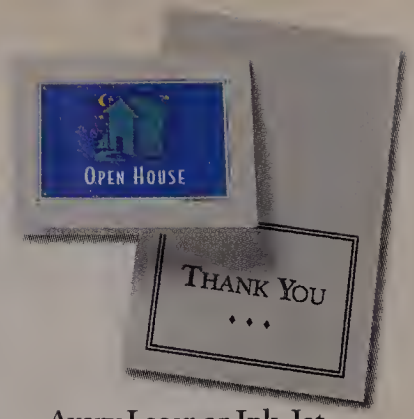

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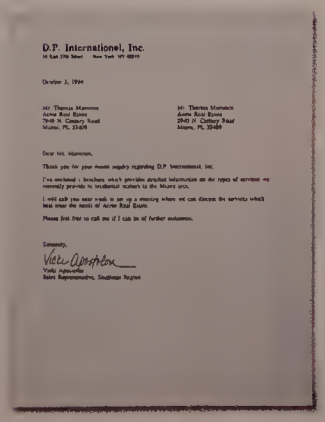

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DATA MANAGEMENT Q&A

Get a Quick Cross-Tab of Your Data

Q I have an Access database of sales data. When I create a report summarizing the data by sales rep and product type, Access presents it in one long list. What I'd like is a matrix with a row for each sales rep, a column for each product type, and the total sales for each combination of sales rep and product type. Can I do this in Access?
Jordan White, San Diego

A What you describe is a *cross-tab*. I'll show you how to create one in both Access and Approach.

If the data you want to summarize is spread across related tables, first you need to create a query that links the sales tables and includes the sales rep, product type, and sales amount fields. Then follow the instructions below.

Access. Select the *Query* tab in Access 2.0's Database window and click *New*. Select *Query Wizards*, and double-click *Crosstab Query*. In Access 7.0, click the arrow next to the *New Object* button and select *New Query*. Double-click *Crosstab Query Wizard* and do the following:

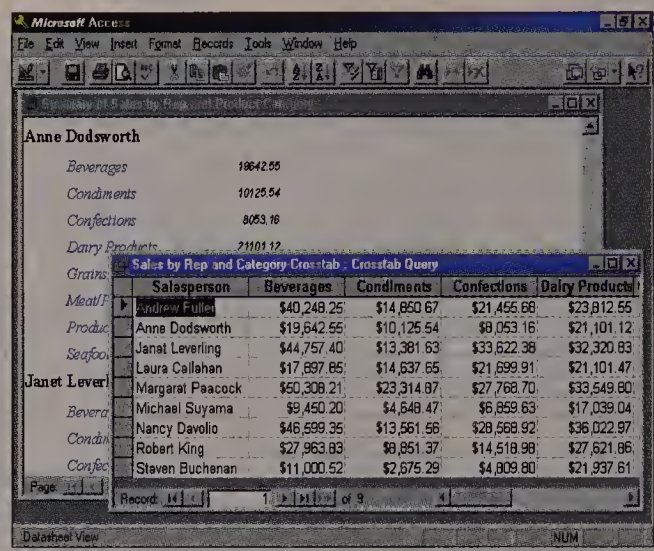


FIGURE 1: AN ACCESS CROSS-TAB is easier to interpret than a report of the same information.

1. Select the query that includes the sales rep, sales amount, and product type fields. Click *Next*.
2. Choose the sales rep field for the row heading. Click *Next*.
3. Choose the product type field for the column heading. Click *Next*.
4. Highlight the sales amount field and the *Sum* function. In Access 2.0, deselect *Calculate Summary for Each Row*. Click *Next*.
5. Change the cross-tab name and click *Finish*.

As you can see in **FIGURE 1** a cross-tab is more concise and easier to understand than a report.

Approach. One method is to select *Create•Crosstab* and then step through the Crosstab Assistant. But dragging and dropping fields in a worksheet view to create a cross-tab view is more fun. **FIGURE 2** shows how to do it.

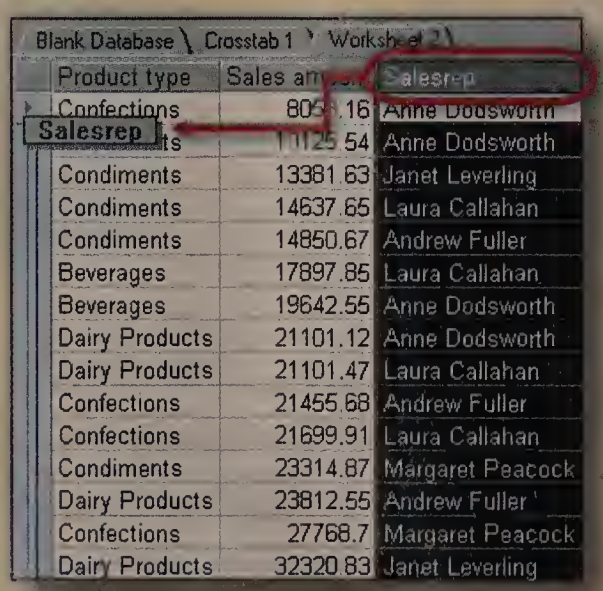
A few warnings: Make sure the field header is in place before you release the mouse. Don't release the mouse if the pointer changes to a trash can, or you'll delete the field from the view. You'll have to start with a fresh worksheet if you accidentally delete a field.

By Celeste Robinson

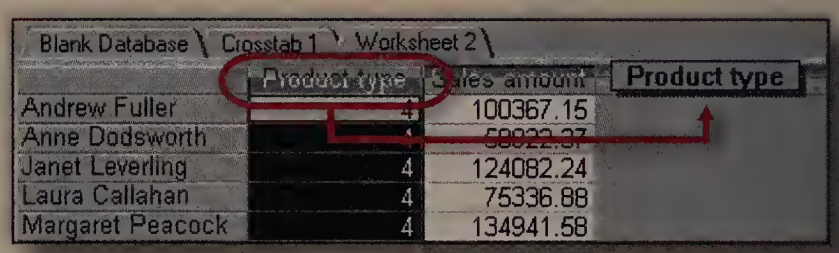
Celeste Robinson is a contributing editor for PC World *and the coauthor of* Mastering Paradox 7 for Windows 95, *Sybex, 1996, 800/227-2346).* Data Management *welcomes your questions. See page 14 for contact information.*

Drag and Drop Your Way to Cross-Tabs in Approach

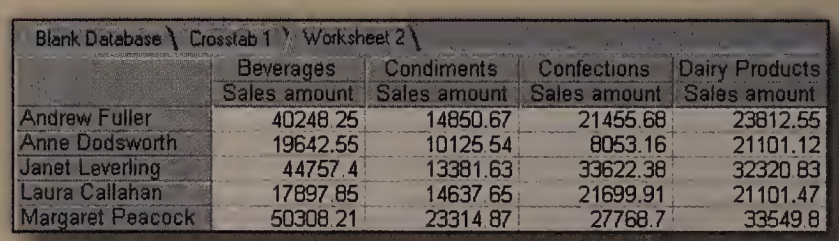
❶ **Drag the Salesrep field to the left of the fields...**



❷ **and drag the Product type field to the right...**



❸ **to create a cross-tab listing each rep's sales by product type.**



	Beverages Sales amount	Condiments Sales amount	Confections Sales amount	Dairy Products Sales amount
Andrew Fuller	40248.25	14850.67	21455.68	23812.55
Anne Dodsworth	19642.55	10125.54	8053.16	21101.12
Janet Leverling	44757.4	13381.63	33622.38	32320.83
Laura Callahan	17897.85	14637.65	21699.91	21101.47
Margaret Peacock	50308.21	23314.87	27768.7	33549.8

FIGURE 2: INSTEAD OF USING APPROACH'S CROSSTAB ASSISTANT, drag and drop the fields into place in a worksheet view.

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ONLINE Q & A

CB-ing on the Internet

Q I've seen several TV shows in which characters "talk" with others on the Internet by typing messages in what looks like computer CB channels. How can I do this?
Raoul Sanchez, New York

A Internet Relay Chat, or IRC, is the Net version of the "chat rooms" feature you find on many online services. You can type to computer users around the world, and they type back to you. Conversation rolls across your screen like dialog in the script to a play.

To participate, you first need to log into one of the thousands of computers that host an IRC channel. To get a list, head to the Internet Relay Chats page (http://uptown.turnpike.net/L/Larry14/irc.html). Most channels are, not surprisingly, sexual in nature. But there are some pretty tame ones.

Next, you'll need to download client software that will let you log into the channels. If you're running Windows, you need the freeware mIRC, available at the Downloading mIRC and the mIRC FAQ page (http://www.geocities.com/colosseum/1822/). After downloading and uncompressing the software, you can fire it up once you've connected to your Internet service.

If you're using mIRC32 for Windows 95, you'll get an mIRC Setup dialog box, as in the figure below. Type a nickname in the dialog box, select an IRC server, and click the *Connect!* button. When you're connected to the server, you'll get the mIRC Channels folder. Select a channel and click *Join*. To join the discussion going on in the channel, start typing. To leave the discussion, select *Commands • Quit IRC*.

In Windows 3.*x*, you connect to an IRC server by typing its address in an mIRC dialog box. Once connected, you can enter **/join #<*channel name*>** to get to the channel you want. To create a nickname, type **/nick <*nickname*>**. To exit, type **/leave**.

OS/2 users can try a shareware program, Internet Relay Chat for OS/2 (irc2_070.zip), located at ftp://cs.ftp.bu.edu/irc/clients/pc/os2/.

Things are a bit more complicated if you use DOS. Head to ftp://cs.ftp.bu.edu/irc/clients/pc/msdos for details; or talk to your Internet service provider.

Before you jump into the bitstream, check out What Is IRC? (http://www.sbcomp.com/mirc/irc.html).

Take That, Spammer!

Are you stewing over spam? Here are your best defenses:

1. Don't reply to the message.
2. On AOL, forward the message to tosemail1 or tosemail2.
3. On CompuServe, forward the message to csi:ecgintern.
4. Complain to your ISP.
5. Contact your state attorney general's office.
6. Get spam FAQs and advice on the Web: http://www.cybernothing.org/faqs/net-abuse-faq.html and http://math-www.uni-paderborn.de/~axel/BL/blacklist.html.

Fight Back Against Spams

Q Lately, I've been receiving a lot of unsolicited sales pitches in my e-mail box. Is there a way to stop these noxious messages?
David Arnolds, Chicago

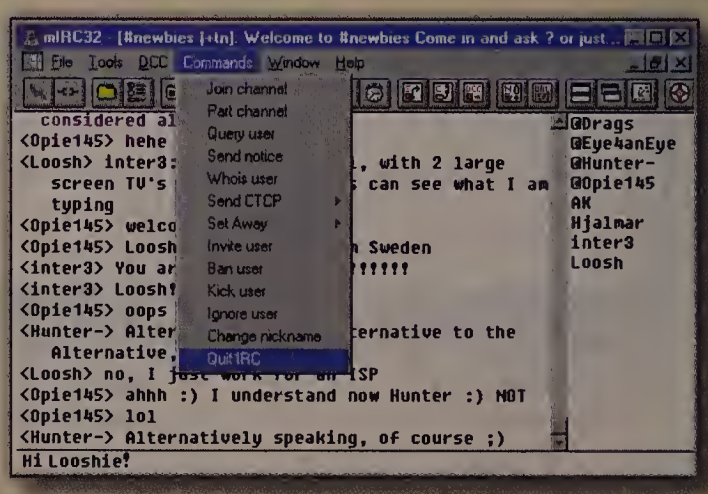
A Mass mailings of e-mail sales promotions, or *spams*, are a growing problem. Both America Online and CompuServe have taken, or are consid-

Chat It Up Online: Join an Internet Kaffeeklatsch

❶ **Select a server, type a nickname, and click Connect.**

❷ **Select a channel and click Join to open a conversation window.**

❸ **Join the discussion by typing into the bottom of the dialog box. Select Commands • Quit IRC to leave.**



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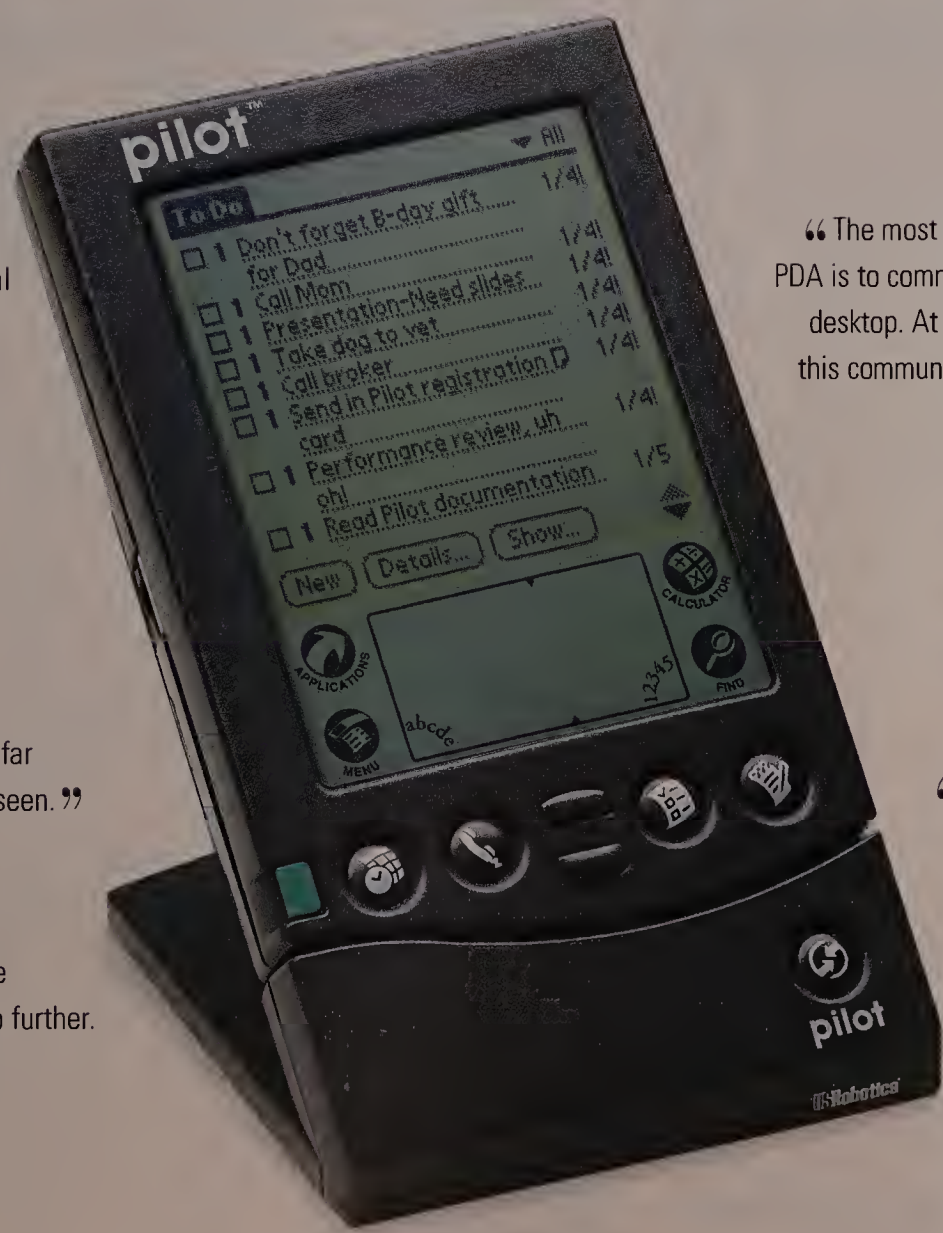

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Circle 173 on reader service card

ering taking, legal action against companies that have been mass mailing to their subscribers. The Telephone Consumer Protection Act of 1991 may be their weapon. Among other restrictions, the TCPA prohibits marketers from sending faxes to customers to pitch products. "One could argue that users pay for connect time to read e-mail advertising, just as they have to pay for toner and paper for faxes," says Pierce Reid, product marketing manager for CompuServe.

America Online filtered out ads that were mailed from the Internet to all its subscribers by a company called Cyber Promotions (formerly Promo Enterprises) in Pennsylvania and returned them to the sender. Cyber Promotions filed suit against AOL, then AOL countersued, charging Cyber Promotions with falsely using AOL's name and trademark and claiming that AOL endorsed the company. Meanwhile, CompuServe is considering criminal and civil actions against Cyber Promotions.

If you're a member of America Online and you receive spam from another AOL member, forward the message to the company's Terms of Service staff at tosemail1 or tosemail2. AOL will terminate the spammer's membership after three complaints.

Web Connection Tips: Keep on Clicking

• If you're having trouble connecting to a page on the World Wide Web, try chopping off the last part of the URL until you get a hit. For example, if you can't connect to http://www.execpc.com/~judyheim/needle.html, try the shorter http://www.execpc.com/~judyheim. If that doesn't work, try the even shorter http://www.execpc.com/. Once you're connected, click your way to the page you want.

• If you spot a name in the Web address preceded by a tilde (~), that's probably the name of a personal directory on an Internet service. These directories usually have an index page. If you log into this directory with your Web browser, you'll find either a default Web page or an index to other pages that the user may have.

• If you get an error message when you enter a URL that ends with '.htm' (for instance, http://www.execpc.com/~judyheim/needle.htm), try ending the address with '.html' instead. The only difference between .htm files and .html files is the name. DOS file extensions are limited to three letters, whereas UNIX, which is the operating system used by most Internet service providers, has four-letter file extensions.

CompuServe subscribers who are spammed by a fellow subscriber can write to csi:ecgintern.

Internet users who receive spam from an AOL member should forward the message to tosemail1@aol.com or tosemail2@aol.com. Spam from a CompuServe member can be forwarded to ecgintern@csi.compuserve.com. You can also complain to your ISP's postmaster. Another option is to contact your state's attorney general.

Replying to the spam with your own angry message is rarely effective. The message could come bouncing back to you, end up in a dead letter box, or go to the e-mail box of another innocent citizen. Some spams are set up so that if you reply to them, the ad is broadcast to thousands more e-mail boxes or Internet mailing lists—and this time the spam looks like it's coming from your address. Some of the nastier spammers set up their messages to look like they originated from the mailbox of an innocent party. Both America Online and CompuServe report instances in which their subscribers' addresses were pirated in this fashion.

Not all spammers are so nefarious. Some do have an address in their header where you can write to get your address removed from their mailings.

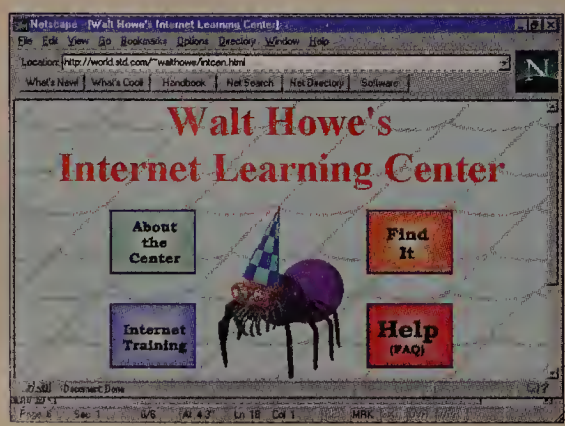
But it's not always easy to spot the Internet address where a message originated. A source of advice is the Usenet newsgroup news.admin.net–abuse.misc. You'll find a FAQ for the group on The Net Abuse FAQ page (http://www.cybernothing.org/faqs/net–abuse–faq.html). More advice can be found in the Blacklist of Internet Advertisers page (http://math–www.uni–paderborn.de/~axel/BL/blacklist.html).

Several efforts are under way on the Internet to develop software and policies to help users screen spams. Most involve ISPs deploying special software that will screen out spams based on complaints. One such project is on the NoCeM page (http://www.cm.org/nocem.html). E-mail filtering programs like Procmail are only marginally effective because it's hard to set up rules for screening out advertisements (many use subject lines like "Hi!" to get you to open the message). It's often easier to hit the Delete key.

By Judy Heim

Judy Heim is a contributing editor and author of Internet for Cats *(No Starch Press, 1995, 800/420-7240). Online welcomes questions and tips and pays $50 for published items. See page 14 for contact information.*

Internet Find: Net Training



Feeling confused about the Internet? Head to Walt Howe's Internet Learning Center (http://world.std.com/~walthowe/intcen.html). You'll find answers to newbie questions, plus easy Net searching for things like mailing lists and newsgroups that interest you.

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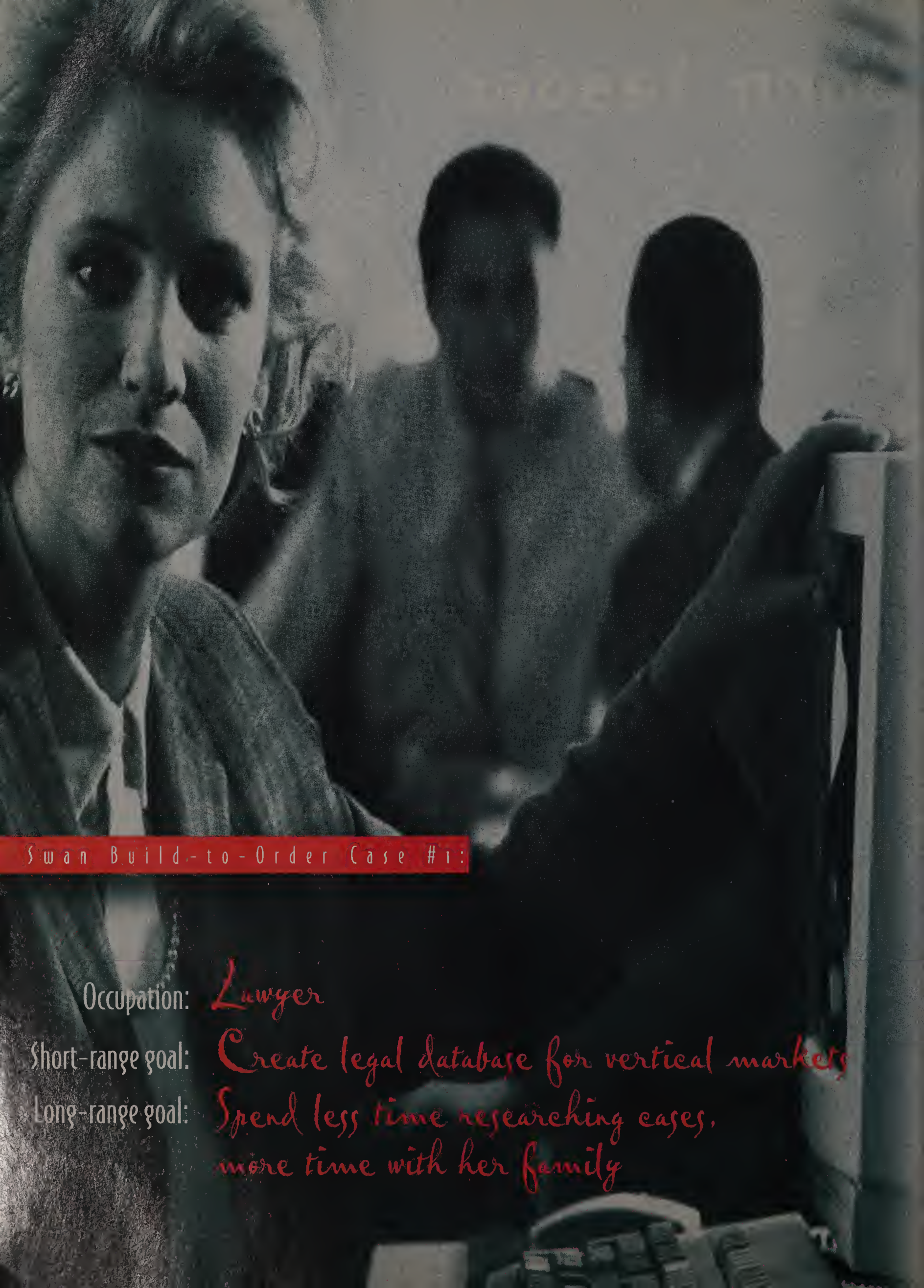

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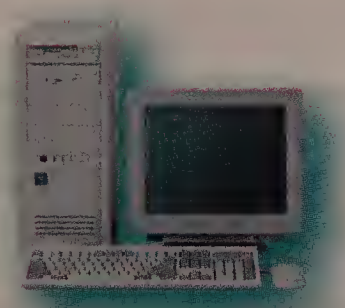

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HARDWARE Q&A

Do-It-Yourself Brain Transplants: Replacing the Motherboard

Q In the November 1995 issue ["Best Upgrades for Your 486"] you recommended a new Pentium motherboard as the best way to upgrade the processor in 486DX2 and 486DX4 systems. How do I go about replacing the old motherboard with the new one?
Isaku Watanabe, Internet

A Anyone with a little mechanical ability can replace a motherboard, and a new Pentium (or compatible) motherboard is your best bet.

But whether you want to make that bet is another question, since you can easily pay half the price of a new computer—money that could have gone toward a considerably faster system that's complete with a warranty.

Remember that this upgrade may require added peripherals. For example, if you have an old hard disk, you may not get the performance you expect until you replace it. And you'll definitely need a new graphics card to exploit the Pentium motherboard's PCI bus, since the graphics card in your 486 PC is almost certainly either a VL or an ISA model.

If your 486 uses 30-pin SIMMs, as most 486s do, those won't work in your new motherboard either, unless you buy SIMM adapters. Those will limit your RAM options—if they even fit in your system (see "Recycle 486 Memory in a Pentium PC" in the lead item in June's column).

Okay, let's say you have a recent-vintage hard disk, 72-pin SIMMs, and a new graphics card and are raring to go. The most important phase of your do-it-yourself brain transplant is selecting the right motherboard.

If you prefer a Pentium (rather than compatible) board, be sure you buy one with an Intel Triton chip set or one of its successors, like the 430HX. I recommend a Pentium-133 CPU; once you add the cost of the motherboard, you'll pay about $650, probably less by the time you read this. Opting for a Pentium-166 adds to the cost ($250 at this writing) and buys you less than 10 percent more speed.

Make sure the motherboard has a BIOS from a reputable vendor—AMI, Award, and Phoenix are three.

Even more important, find a motherboard that fits comfortably in your machine: The screw holes should be in the right place, the keyboard connector should be accessible, and the slots should line up with the rear slot covers. A motherboard that won't let you screw down expansion cards properly will be a constant headache.

Suppliers are overoptimistic about which machines will take their boards, so unless your replacement is from the same vendor as the original, you won't know if it will really fit until you try. Make sure you can return the board if necessary, or pay an extra $50 to $100 for a new chassis.

Once you've chosen your new motherboard, here are nine steps to a successful swap:

1. Collect your old motherboard's CMOS settings. Write down all the parameters for each hard disk, including the capacity, the number of cylinders, the number of heads, and the sectors per track (along with the write precompensation and landing zone, if applicable). Note any special hard disk transfer mode options. Write down all the port and other interface settings. Don't bother with the memory settings or cache settings, since those are unique to the board.

If your hard disk uses either the Disk Manager or EZ Drive remapping software, get rid of it, because your new motherboard's BIOS won't need it to support EIDE drives over 528MB (see "Giving Disk Manager the Boot" in February's column). And while you're at it, take the usual and sensible precaution of backing up your hard disk completely.

Three Tips for Swapping Motherboards With Minimal Risk and Frustration

FIGURE 1: LABEL THE LITTLE WIRES from the hard disk light, reset button, and other components so that they're easier to attach to the new board.

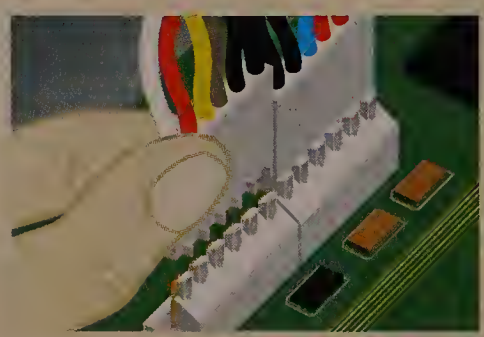

FIGURE 2: DON'T YANK POWER CONNECTORS upward; to remove them, snap them forward. They are keyed so you can't plug them in the wrong way.

FIGURE 3: IF THE OLD MOTHERBOARD sits on mounting posts, squeeze the posts evenly on both sides with your pliers and gently pull the board up.

2. Have the tools you'll need at hand. You'll want a Phillips screwdriver, a flashlight, needle-nose pliers, and tweezers. Depending on how many devices you have in your computer and whether your old CPU had a fan, you may also need a Y-cable for the power cord so you can hook up the fan for the new unit.

3. Open up the PC and remove cards, cables, and motherboard. It's time to turn off the system and pop the hood. Leave your PC plugged in so you can ground yourself while you work by touching the metal chassis to avoid a chip-frying static discharge.

Now take that screwdriver and remove every card in your system.

Then pull out any device, such as an overhanging hard disk cage, that blocks the motherboard.

You'll also need to unplug cables from the motherboard and in some cases from obstructing devices. Label each unplugged cable with a clear description of the connector that it was plugged into (see **FIGURE 1** on the previous page).

And don't yank the two four- or five-wire power cables that plug side by side into the motherboard! Gently snap their (usually white) connectors forward, and you can extract them easily (see **FIGURE 2**).

Removing the screws that affix the motherboard is easy, but the winged plastic mounting posts that typically stick through holes in the board can make life miserable: You have to squeeze the posts evenly on both sides with the pliers and pull the motherboard gently upward at the same time (see **FIGURE 3**).

If a screw drops into a tight place, grab it with the tweezers. I've seen a loose screw cause a short circuit that burned a hole right through the board.

4. Add and align the new motherboard. Slide the new board into the system and align everything as best you can.When you screw down the motherboard, keep the screws loose at first, so you'll have a better chance of getting all the holes to line up. When you tighten, don't do it too hard, or you might crack the board.

5. Reconnect the cables. Plug in the power cables first. They're keyed so you can't plug them in the wrong way (the black wires are oriented toward the middle of the set).

It's common to discover that the wires for items like the speaker, the power light, the hard disk light, the keylock, and the reset button won't reach their designated pins on the new motherboard. You can be ambitious and splice in extensions, or just leave them all unconnected and live with the inconvenience.

When you connect ribbon cables to interfaces on the motherboard, remember that a red stripe along one edge of the cable indicates that side of the cable goes over pin 1. The first pin on each interface on the motherboard should have a tiny "1" beside it, but you may need your flashlight to read it.

6. Add cards, the fan, and memory. Now replace all the expansion cards, making sure any card with a ribbon cable plugs into a slot as near as possible to its associated device. Hook up your CPU's fan to the power supply, using the Y-cable if necessary. Next, install your 72-pin SIMMs (or 72-pin SIMM adapters with 30-pin SIMMs). If you removed it, replace the hard drive, remembering to reconnect its controller and power cables.

7. Turn on your system and pray. If the system goes through its power-on self-test, congratulations—you're past the first big hurdle.

8. Go reconfigure. Next you'll be told you have a configuration error and that you should change the CMOS settings ('Press F2 to configure' or some such message). Find the settings for the primary hard disk and enter the parameters you wrote down. This is more reliable than running an autodetect routine, but some BIOSes will force you to autodetect anyway, and it will probably work. Then make sure your port and other interface settings match those for your previous system. Save your settings, exit the BIOS setup routine, and reboot.

9. Add drivers for Windows 3.*x* or Windows 95 as necessary. Your system should now boot from the hard disk.

If you're running Windows 3.*x*, you'll need to replace a driver or two if you've installed a new graphics card.

If Windows 95 is on your hard disk, expect to see an endless series of "unknown device; installing drivers" messages as the operating system detects the new motherboard. You may have to reboot a few times, but Windows 95 should be able to handle the reconfiguration automatically.

Be sure to check the devices that Windows 95 thinks you have in your system, since it often guesses wrong. If so, use Control Panel's Add New Hardware utility to manually select the correct devices and their drivers.

By Eric Knorr

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Hardware *welcomes your tips and questions and pays $50 for published items. See page 14 for contact information.*

Tips for Buying the Right Motherboard

- **Make sure it will fit! Your best bet is a motherboard from the supplier who made the old one.**
- **Buy at least a Pentium-133 (or equivalent) CPU.**
- **Get at least 256K of secondary cache memory.**
- **For Pentiums, get a Triton or 430HX chip set.**
- **Make sure there are at least three PCI and four ISA slots.**
- **Go with a BIOS from a reputable brand such as AMI, Award, or Phoenix.**

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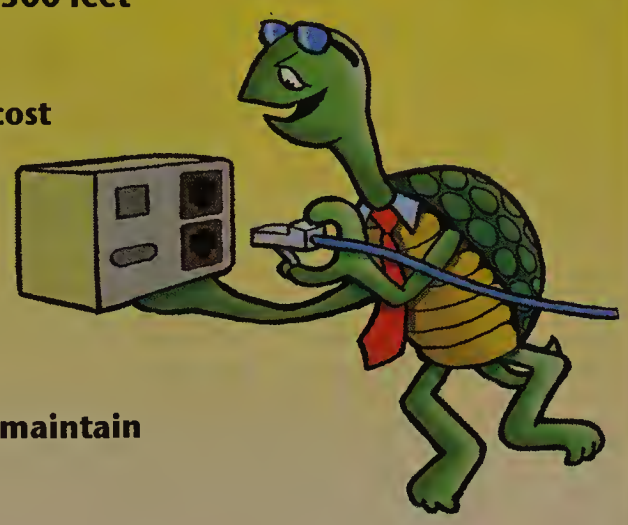

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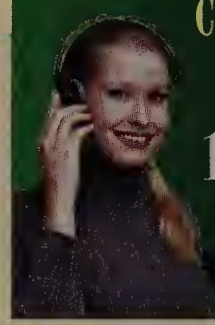

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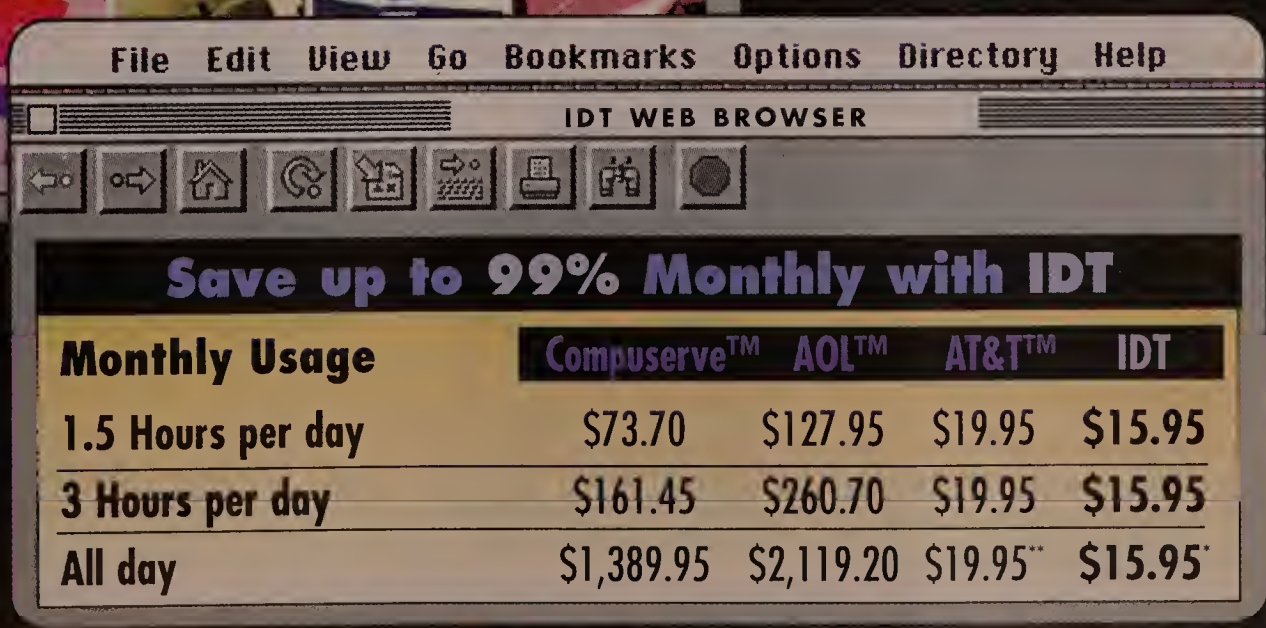

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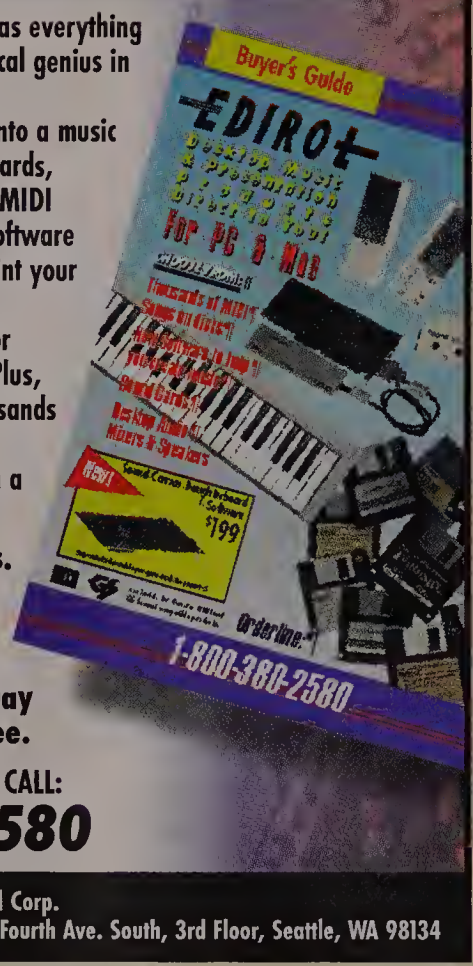

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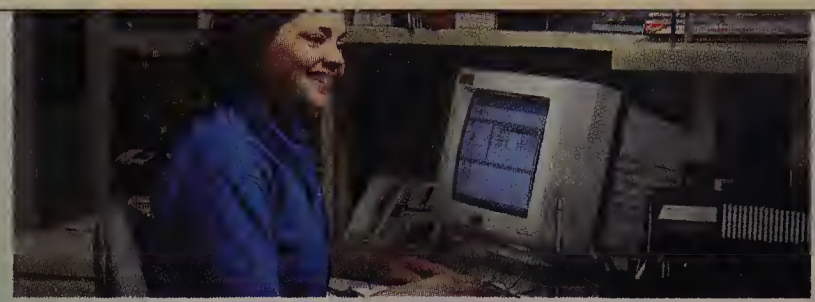

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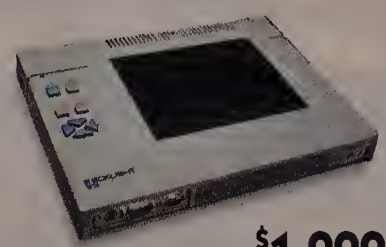

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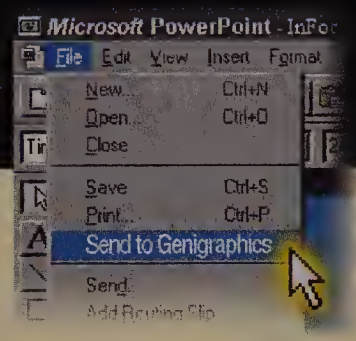

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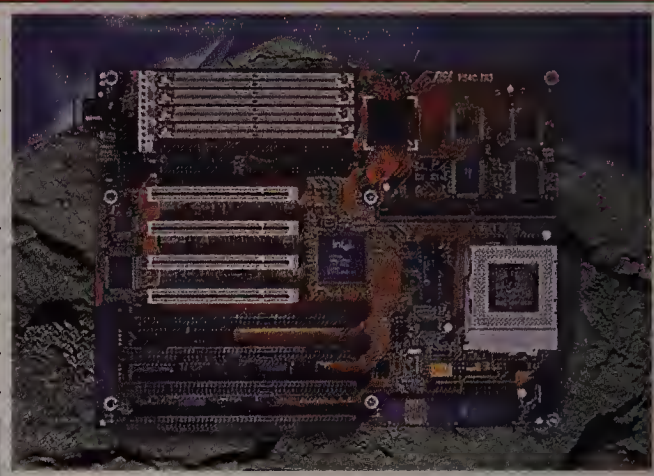

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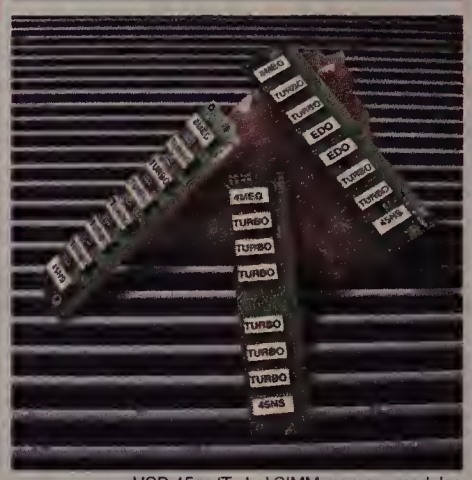

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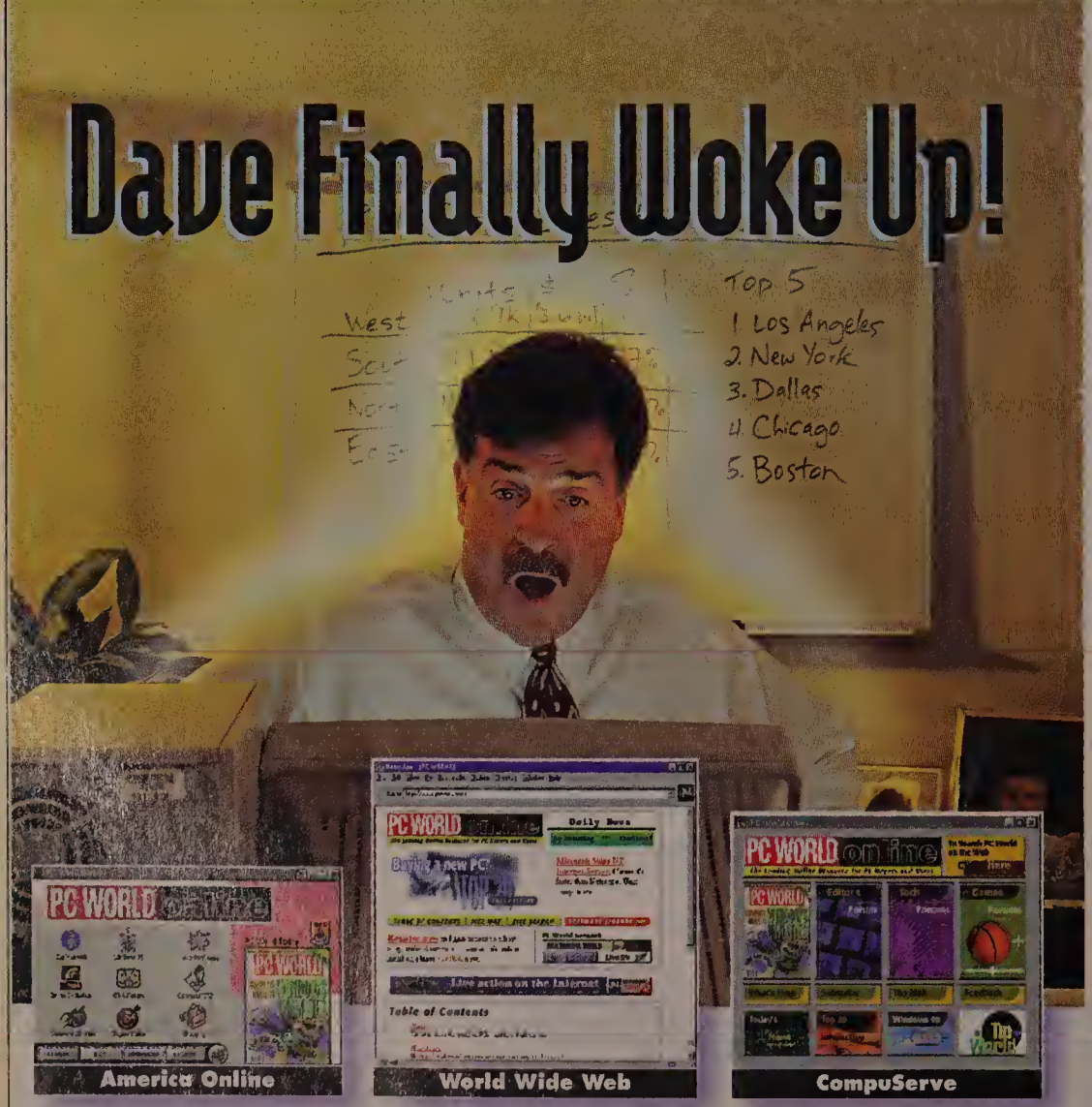

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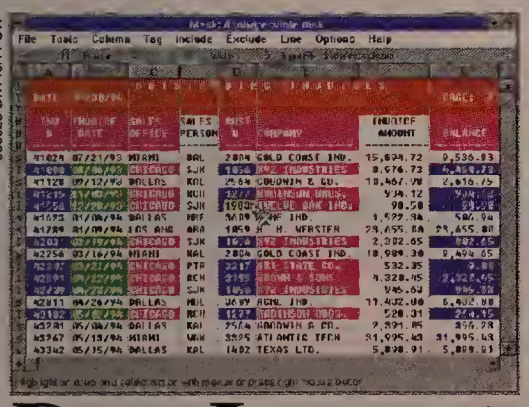

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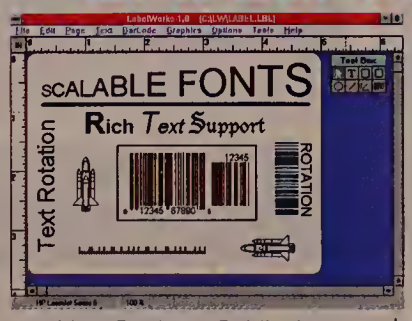

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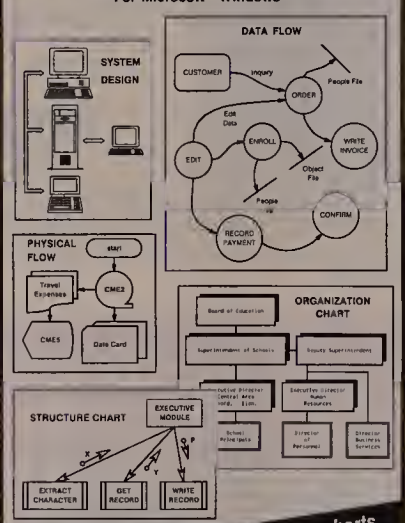

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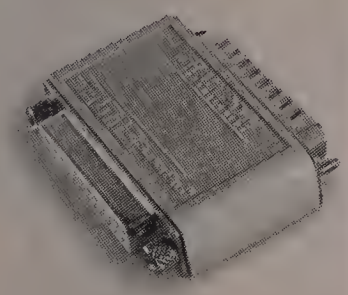

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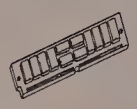

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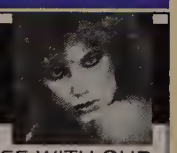

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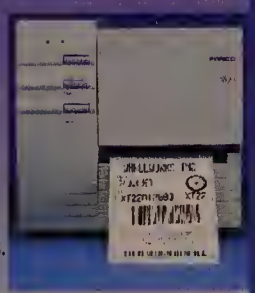

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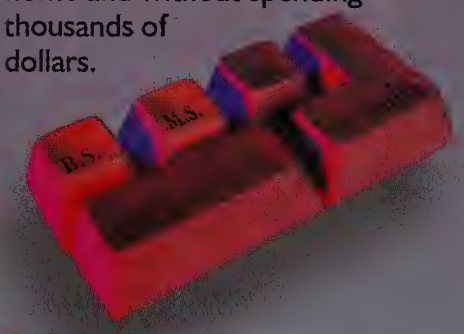

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- MFC-4500 ML (Multifunction Laser) $959
- MFC-5000 ML (Multifunction Laser) $999

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- microLaser 600 ..... $679
- microLaser PowerPro/12 ..... $1199

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- OL610e $519
- OLB10E $709
- ML320/ML321 ..... $319/$449
- ML590/ML591 ..... $449/$609
- Okijet 2010 ..... $299

**Price after Rebate*

CANON
- BJC-210 Color $179
- BJ-230 wide carriage $384
- BJC-70 Color $299
- BJC-4100 Color $269
- BJC-610 Color $429

LEXMARK
- Winwriter 150C $279
- Color Jetprinter 1020/2070 ..... $209/$399
- 23B0/23B1 Plus Dot Matrix Printer ..... $324/$429
- 2390/2391 Plus Dot Matrix Printer ..... $369/$469
- 4079plus $2539
- 4226 Dot Matrix $1259
- 4039 10Plus $1089
- Optra E $549
- Optra R+/OptraR+ ..... $1259/$1489
- Optra Lx+/Optra Lxn+ ..... $1865/$2239
- Optra C $5999
- Optra N $2689
- Optra N w/16MB RAM $3389

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- KX-P6500 ..... $419
- KX-P1150/P2023 ..... $135/$179
- KX-P3124 ..... $315
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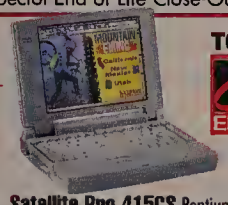

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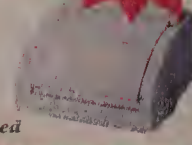

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- NEW Tecra 720CDT Pentium 133, 12.1 Active Color, 1.2GB, 6x CD-ROM, 28.8 Modem $6037

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- EXTENSA 560CD Pentium 75, 10.4" Dual Scan, 810MB $2420
- EXTENSA 560CDT Pentium 75, 10.4" SVGA Active, 1.2GB $3394
- EXTENSA 570CD Pentium 100, 11.3" Dual Scan, 810MB $2896
- EXTENSA 570CDT Pentium 100, 10.4" SVGA Active, 1.2GB $3919
- TI5100 Pentium 90, 10.4" SVGA Color, 1.2GB $3350
- TI5200 Pentium 120, 10.4" SVGA Color, 1.2GB $4039
- TI5300 Pentium 133, 11.3" SVGA Color, 1.2GB $4612

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- 5000CTS, 120MHz Pentium, 16MB RAM, 1.2GB HD $4827
- 5500CTS, 133MHz Pentium, 16MB RAM, 1.35GB HD $5847

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- VERSA 2205C Pent. 75, 9.5" Active Color 810MB, 14.4 Modem $2399
- VERSA 4050C Pentium 90 Active Color 810MB 4X CD-ROM $4239
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- P30 CSS11, 100MHz Pentium, 11.3" Dual Scan, 4X CD-ROM, 1.2GB HD $3375
- P50 CTS11, 133MHz Pentium, 11.3" Active, 4X CD-ROM, 800MB HD $4221
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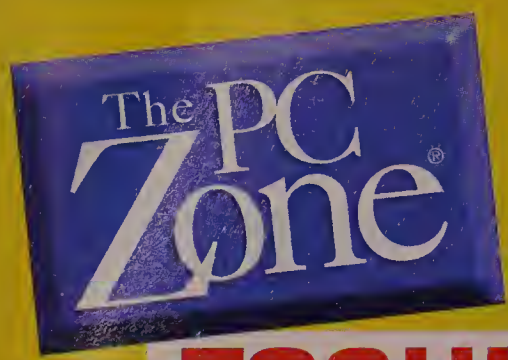

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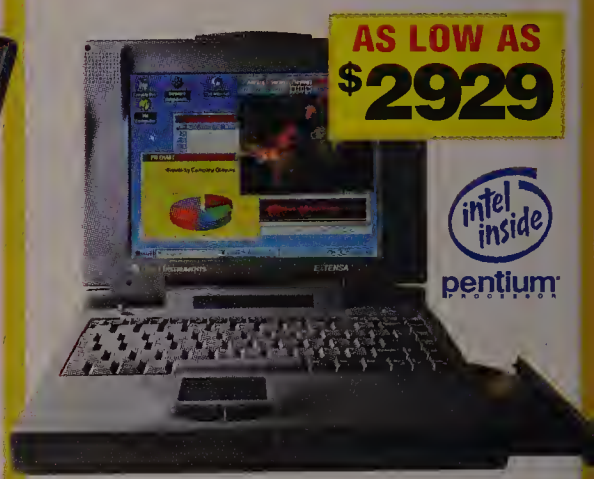

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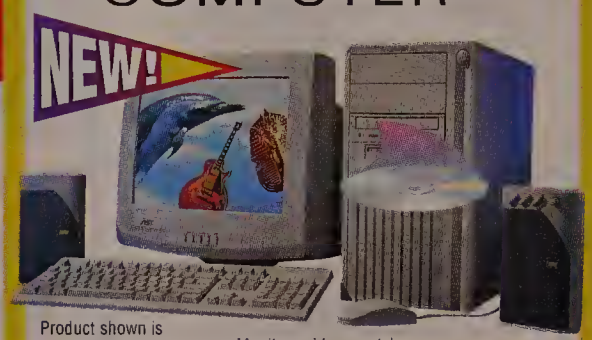

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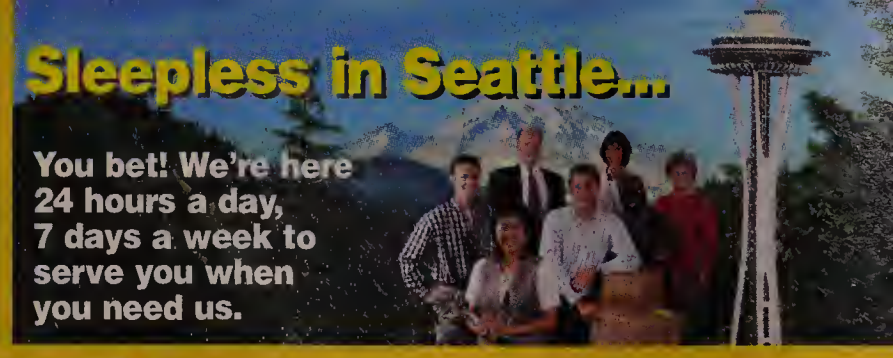

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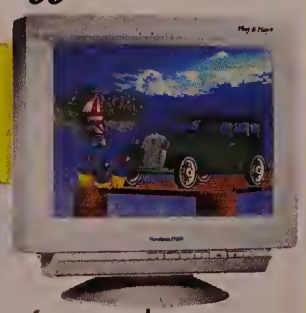

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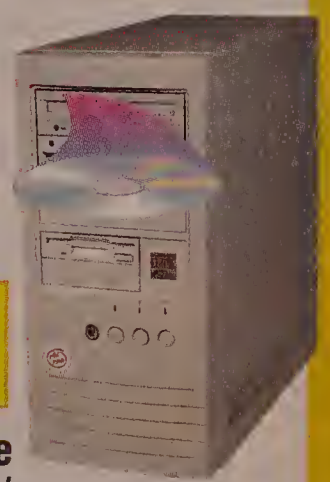

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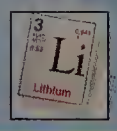

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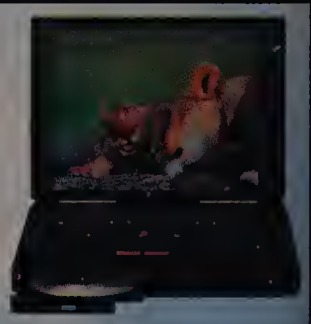

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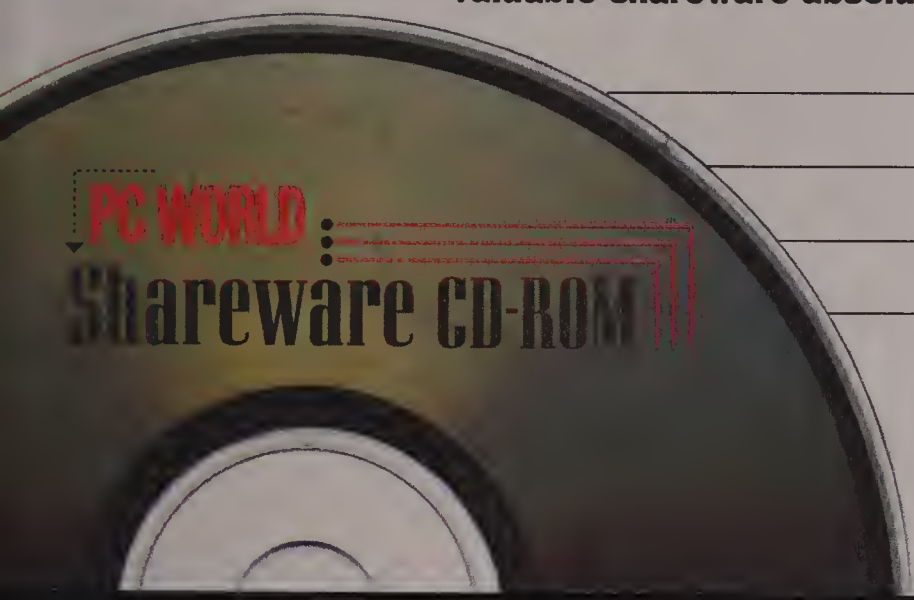

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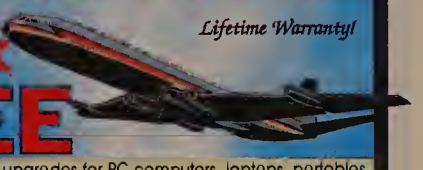

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1060 SCSI		279						
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S-RAM Cards 1MEG	$119	Portable CD RDM (2x) & Card	$289
S-RAM Cards 2MEG	199	*SCSI Type II*	*119*
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14.40D/14.4D0 Data/Fax Modem	94	Multimedia Combo, Sound/SCSI	499
Readwriter Card (15A Slot)	149	Type III 260 Mg Hard Drive	419
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Tecra 700, 710, 720 (SDRAM)	*8Meg/16Meg/32Meg*		*245/459/8*
Tecra 700, 710, 720	*810Meg/1.3Gig*		*739/79*
T2000SXE/2200SX/T1800, 1850, C	2Meg/4Meg/8Meg	PC-PA2000U	69/119/21
T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg		107/259/449/67
T4400SX, SXC T6400, T6600	4Meg	PC-PA2004U	95.0
T4400SX, SXC T6400, T6600	8Meg	PC-PA2005U	179.0
T4400SX, SXC T6400, T6600	16Meg	PC-PA2010U	329.0
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	99.0
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	179.0
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg	PC-PA2014U	329.0
T4700, 4800, 4850 (Hard Drive)	810Meg/1.3 Gig		709/81
T3400CT, T2400, T3600	4Meg/8Meg/16Meg	PC-PA2019U	129/249/51
T600, 610, CT Edo	8Meg/16Meg/32Meg		159/339/66
T400CS, 400CDT, T100, 105 Edo	*8Meg/16Meg/32Meg*		*159/339/66*

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRIC
ACER 730, 735C, 760, 780	2Meg/4Meg/8Meg		69/99/19
ACER 763, 765, 782, 784, 786, 787,	4Meg/8Meg/16Meg		99/189/38
ACER 750	4Meg/8Meg/16Meg		99/189/38
ACER Note Pro, ACER Note Lite	*4Meg/8Meg/16Meg*		*69/125/26*
ARM TS38	4Meg/8Meg/16Meg		109/189/39
AST Ascentia J10	*8Meg/16Meg/32Meg/40Meg Kit*		*139/249/529/69*
AST Ascentia 900N, 800N, 810, 910	4Meg/8Meg/16Meg		99/199/34
AST Ascentia 950	8Meg/16Meg		199/39
AST Bravo & Explorer	*4Meg/16Meg*	*501255-001, -002*	*95/32*
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	109.0
AST Power Exec 3/25C, 425EL, 425SL	4Meg/16Meg	501166-001, -003	99/37
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	99/38
AT&T Globalyst 130, 200 *(Call for other Globalyst)*	4Meg/8Meg/16Meg		109/189/31
AT&T Safari NSX/20	4Meg	PEC 37651	149.0
Austin 0X4, 0X2, SX2, SX Series	4Meg/16Meg		99/35
8ondwell 8310, Plus	1Meg	23050-09100	59.0
8ondwell 8310V, SX	4Meg		206.0
Canon Innova 8ook 150	4Meg/16Meg		89/22
Canon Innova 8ook 200LS	4Meg/8Meg/16Meg/24Meg		119/199/359/61
Canon Innova 8ook 350CD	*4Meg/8Meg/16Meg*		*95/145/26*
Canon Innova 486-10	4Meg/16Meg		109/37
Canon Notejet 486-25	4Meg/8Meg		89/22
Canon Notejet 486-33, 486C, 25 and 33	4Meg/8Meg		89/22
Canon Notejet 486c, 75, 100	8Meg/16Meg		169/37
Compuadd 450ns, 475ns	4Meg/16Meg		109/38
DEC HiNote, Ultra HiNote	4Meg/8Meg/16Meg		109/189/38
DEC HiNote VP	*8Meg/16Meg/32Meg/64Meg*		*165/329/659/301*
Dell Lattitude LX 4100C, MX, MC, M	4Meg/8Meg/16Meg		109/179/38
Dell Lattitude XPI	4Meg/8Meg/16Meg		109/179/38
Dell Lattitude XP, 475, 4100, 4100CX	4Meg/16Meg		109/38
Dell Latitude 486, 425, 433C, 433CX, 450, 450CX	4 Meg/16 Meg		109/39
DTK, OTN 4T 100P, 5P60	4Meg/16Meg/32Meg		229/469/91
Epson ActionNote 650, 650c, 660c, 660cx	4Meg/8Meg/16Meg		109/179/38
Epson ActionNote 700, 700c, 700cx	2Meg		99/37
Epson ActionNote 800, 880, 866c	4Meg/8Meg/16Meg/20Meg		99/189/369/49
Epson ActionNote 890	*4Meg/8Meg/16Meg*		*85/139/26*
Epson ActionNote 4000 Notebook	6Meg		129.0
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-50	6Meg		129.0
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Gateway 2000 486 Handbook or Liberty	4Meg/16Meg		99/37
Gateway 2000 Solo Series	8Meg/16Meg/32Meg		Ca
HP Omnibook 300, 480, 425	2Meg/4Meg		83/12
HP Omnibook 530, 600	4Meg/8Meg/12Meg		99/189/37
HP Omnibook 4000	4Meg/8Meg/16Meg		99/199/34
HP Omnibook 5000	8Meg/16Meg/32Meg		169/325/53
Leading Edge Aviva 2000	4Meg/16Meg		109/39
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Midwest Micro Elite Snobik SX33, DX3-50, DX4-75, DX4-100	4Meg/8Meg/16Meg		99/189/37
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NCR Safari 3180, 3181	4Meg/8Meg		119/24
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Sanyo 17/18 N8	2Meg	M8C-N8MEM2	89.0
Sharp 6781, 6881, 6785, 6700, 6800, 6741	2Meg/4Meg		89/14
Sharp 8150, 8650, 8660, 7700, 7760	4Meg/16Meg		89/36
Sharp 8700, 8800, 8900	4Meg/8Meg/16Meg		99/189/36
Sharp 3010, 3020, 3050, 3060	4Meg/8Meg/16Meg		99/189/36
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Twinhead, Altima, Compudyne, 486SX, 0X, Tandy 4860	4Meg/16Meg		109/36
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Mag Innovision MX21F 21" .28mm	1484.25
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ViewSonic 17GS 17" .27mm	651.18
ViewSonic Optiquest V775 17" .26mm	684.72
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HP DeskJet 855Cse color printer	499.00
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microLaser Pro/8	1107.16
microLaser PowerPro/12	1362.58

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Seagate

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631MB Fast-ATA	174.06	2.14GB Fast SCSI-2	701.71
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1.6GB Fast-ATA2	291.47	9GB Fast SCSI-2	2044.42
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Caviar 853MB EIDE	193.66
Caviar 1GB EIDE	218.32
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Acculogic SIDE-4+ w/par 2 serial game	27.74
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Adaptec PCI Ultra Wide SCSI Kit	299.10
Adaptec Power Storage ISA Kit	609.46
Adaptec Power Storage PCI Kit	609.46
Promise 2300+ EIDE VLB	49.47

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Online Express 14.4 external w/fax	67.87
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V.34 28.8 external w/fax	209.64

Hayes

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ACCURA 144 external w/fax	94.51
ACCURA 288 V.34 internal w/fax	156.88
ACCURA 288 V.34 external w/fax	168.69
OPTIMA 288 V.34 internal w/fax	359.58
OPTIMA 144 external w/fax	371.72
OPTIMA 288 Business Modem	425.70

MICROCOM

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DeskPorte 28.8S Fast V.34, external	181.73

MOTOROLA

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U.S. Robotics

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Hayes EZJack 14.4 w/fax	163.46
Hayes EZJack V.34 28.8 w/fax	219.00
IBM 14.4 modem	48.50
IBM 28.8 data/fax modem	259.11
IBM Ethernet adapter 10BT	123.67
IBM Token-Ring 16/4	287.29
Linksys Ethernet combo	135.70
Megahertz 10BT Enet adapter w/XJACK	134.03
Megahertz 28.8 V.34 data/fax w/ XJACK	259.96
Megahertz 28.8 V.34 cellular w/XJACK	269.67
Megahertz 28.8/Enet cellular w/XJACK	404.10
Megahertz 28.8/Enet combo cellular w/XJACK	427.94
Motorola Montana 28.8 cellular	252.32
Motorola Mariner 28.8 data/fax & LAN cellular	466.52
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New Media Wave Jammer sound card	221.41
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Simple 28.8 Communicator	247.79
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SMC EtherEZ 28.8/Ethernet combo	458.76
USR Sportster V.34 28.8 with DataView	243.27
Xircom Ethernet 10BT	139.23
Xircom Ethernet combo	182.33
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Xircom Ethernet+modem 28.8 10BT	387.13
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- Up to 11.3" Super VGA Active Matrix displays

Processor	Screen	RAM/HD	Price
Pentium 90	9.5" Active	8/720MB	$3139
Pentium 133	11.3" Active SVGA	16MB/1.2GB	4499*

* Features 28.8 fax/modem

Tecra 500

Tecra 500

- Pentium 120MHz processor
- Built-in 6X CD-ROM drive (500CDT model only)
- 16MB EDO RAM memory
- 12.1" Super VGA displays

Processor	Screen	RAM/HD	Price
Pentium 120	12.1" Dual Scan SVGA	16MB/1.3GB	$3999
Pentium 120	12.1" Active SVGA	16MB/1.3GB	4999*

* Features 6X CD-ROM drive

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Processor	Screen	RAM/HD	Price
Pentium 133	12.1" Active SVGA	16MB/1GB	$6299

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- Pentium 100MHz processor
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- Built-in SoundBlaster Pro compatible audio

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8/810MB	$2999
Pentium 100	11.3" Active SVGA	8MB/1.3GB	3899

Satellite 100/110

- Pentium 75 & 100MHz processors
- Up to 11.3" Dual Scan and Active Matrix displays
- Built-in AC adapter
- Fast system performance with EDO RAM memory

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/504MB	$1799
Pentium 100	11.3" Dual Scan SVGA	8/810MB	2299
Pentium 100	11.3" Active SVGA	8/810MB	2799

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- 32-bit PCI Local bus graphics
- 16-bit sound, speakers and mic. (365XD)
- Infrared port for wireless communications
- External floppy drive (365XD)

Processor	Screen	RAM/HD	Price
Pentium 100	10.4" Dual Scan SVGA	8/810MB	$2499
Pentium 100	11.3" Dual Scan SVGA	8/810MB	2799 *
Pentium 100	11.3" Active SVGA	8/810MB	2899
Pentium 120	11.3" Dual Scan SVGA	8MB/1.1GB	3299 *
Pentium 120	11.3" Active SVGA	8MB/1.1GB	3699 *

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- Built-in 16-bit SoundBlaster compatible audio
- External floppy drive reduces weight
- EDO RAM memory enhances performance
- Infrared transceiver for wireless communication

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8/810MB	$2699
Pentium 120	12.1" Active SVGA	8/810MB	3749
Pentium 133	12.1" Active SVGA	8MB/1.1GB	4199

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ThinkPad® 560

NEC

NEC Versa 4000

Processor	Screen	RAM/HD	Price
Pentium 75	10.1" Active	8/810MB	$3799*
Pentium 90	10.4" High Res.	8/810MB	3799
Pentium 90	10.1" Active	8/810MB	3999*
Pentium 120	10.4" High Res.	8MB/1GB	4099

* Features built-in 4X CD-ROM drive

NEC Versa 4000

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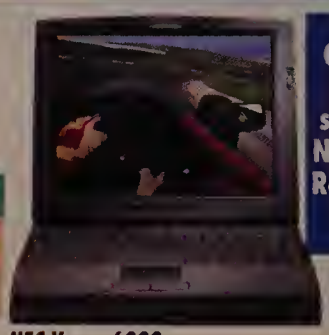
NEC Versa 6000

- Up to Pentium 133MHz processors
- Built-in 6X CD-ROM drive
- 2MB video memory
- Built-in 28.8 cellular fax/modem

Processor	Screen	RAM/HD	Price
Pentium 100	12.1" Active SVGA	16MB/1.1GB	$ 5399
Pentium 133	12.1" Active SVGA	16MB/1.3GB	5999
Pentium 133	12.1" Active SVGA	16MB/1.4GB	6499



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- 11.3" Dual Scan & Active display with 800x600 resolution
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- Built-in SoundBlaster 16 Vibra chipset

Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8/800MB	$3299
Pentium 100	11.3" Dual Scan SVGA	8MB/1.2GB	3779
Pentium 133	11.3" Active SVGA	8/800MB	4249
Pentium 133	11.3" Active SVGA	8MB/1.2GB	4729

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- Integrated 14.4/14.4 data/fax modem and audio
- PCI bus architecture with 256KB Level 2 cache
- 10.4" SVGA (800x600) resolution Dual Scan and Active display

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan SVGA	8/500MB	$2149
Pentium 75	10.4" Dual Scan SVGA	8/800MB	2349
Pentium 100	10.4" Dual Scan SVGA	8/800MB	2639
Pentium 100	10.4" Active Matrix SVGA	8/800MB	2839
Pentium 133	10.4" Active Matrix SVGA	8/800MB	3299

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- Integrated 3-D surround sound (selected models)
- 64-Bit PCI Local bus graphics
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- Enhanced IDE interface-fast disk performance

Processor	RAM/HD	CD-ROM	Price
Pentium 100	8MB/1.2GB	6X	$1399
Pentium 100	16MB/1.2GB	6X	1599
Pentium 133	16MB/1.2GB	6X	1799
Pentium 133	16MB/1.6GB	6X	2099
Pentium 150	16MB/1.6GB	6X	2149
Pentium 150	16MB/2.1GB	6X†	2399
Pentium 166	16MB/2.1GB	6X†	2519

† with 3 disc CD changer

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- 32-bit PCI controller for fast disk performance
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*4X CD-ROM on 7610

Processor	RAM/HD	CD-ROM	Price
Pentium 120	8MB/1.2GB	4X	$1560
Pentium 120	16MB/1.6GB	6X	1850
Pentium 133	8MB/1.2GB	6X	1750
Pentium 133	16MB/1.6GB	6X	2050
Pentium 150	8MB/1.2GB	6X	1950
Pentium 150	16MB/2GB	6X	2340
Pentium 166	16MB/2GB	6X	2630

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HP DeskJet 600C printer C4547A	199.00†
HP DeskJet 660C printer C2164A	299.00†
HP DeskJet 660Cse printer C4548A	269.00*†
HP DeskJet 682C C4567A#ABA	329.00†
HP DeskJet 820Cse printer C4568A#ABA	399.00†
HP DeskJet 855C printer C4551A	449.00†
HP DeskJet 855Cse C4575A#ABA	499.00†
HP DeskJet 1600C printer C3540A	1299.99†

Home Office Products

HP OfficeJet LX C2891A	$ 599.99
HP FAX-700 C3530A	509.99

* Includes Family Font Package
† Includes HP Color Kit

Hewlett-Packard Scanners

HP ScanJet 4C scanner C2527B	$ 949.99
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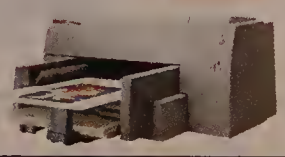
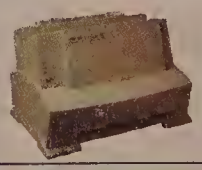
HP Tape Drives

HP T1000 (internal) C4320RB	$ 169.00
HP T1000e (portable) C4326RB	219.99
HP SureStore, 2GB, DAT, Int C1525F	899.99
HP SureStore, 8GB, DAT, Ext C1529F	1220.00

BIG SAVINGS ON HP PRINTER BUNDLE


C4567A#ABA
HP DeskJet 682C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CD ROM DRIVES

• SCSI DRIVES •

Brand	Model	Spin	Speed	Internal	External
NEC	CDR222	4X	200ms	$99	$189
Sony	CDU76S	4X	250ms	$125	$215
Pioneer	DRU124X	4.4X	140ms	$109	$199
Plextor	PX43CE	4.5X	130ms	$239	$329
Teac	CD56S	6X	160ms	$235	$325
NEC	CDR512	6X	150ms	$249	$339
Plextor	PX63CS	6X	145ms	$279	$369
Philips	PC80S	8X	195ms	$239	$319
NEC	CDR1410	8X	145ms	$259	$349
Toshiba	XM5601B	8X	145ms	$269	$359
Plextor	PX83CS	8X	115ms	$415	$505

Mac kits also available.

• ATAPI DRIVES (IDE) •

Brand	Model	Spin	Speed	Internal	Int Kit
Mitsumi	CRMCFX400	4X	230ms	$65	$80
Toshiba	XM5302B	4X	190ms	$71	$86
Toshiba	XM5522B	6X	170ms	$89	$104
NEC	CDR1300	6X	145ms	$99	$114
Teac	CD56E	6X	110ms	$119	$134
Teac	CD58E	8X	110ms	$129	$144
Toshiba	XM5602B	8X	145ms	$145	$160
New	IDECD10X	10X	130ms	$289	$304

Sound Blaster 16 PnP $99 Sound Blaster 32Pnp $155

• CD CHANGERS •

CD ROM Changers allow you to have multiple disks online at one time. No more switching disks.

Brand	Model	Disks	Spin	Speed	Price
Internal IDE					
New	CDR3X4	3	4X	230ms	$99
NEC	CDR4X4	4	4X	250ms	$179
External SCSI					
Pioneer	DRM-624X	6	4.4X	190ms	$299
Pioneer	DRM-1804X	18	4X	300ms	$1899

• CD ROM TOWERS •

For fast access to multiple CD's at one time. Perfect for schools, BBS, networks, and more. Toll free support.

			4 Drives	7 Drives
4X	200ms	NEC	$759	$1259
4.4X	140ms	Pioneer	$799	$1299
4.5X	130ms	Plextor	$1499	$2529
6X	160ms	Teac	$1439	$2439
6X	150ms	NEC	$1559	$2629
6X	145ms	Plextor	$1699	$2899
8X	195ms	Philips	$1459	$2499
8X	145ms	NEC	$1559	$2629
8X	145ms	Toshiba	$1999	$3449
8X	115ms	Plextor	$2299	$3999

2 to 21 drive configurations available. Call.

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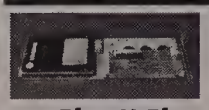
1Gig [SSSPP1GIG] $349 2Gig [SSSPP2GIG] $479
1.6Gig[SSSPP1.6GIG] $429 2.5Gig [SSSPP2.5GIG] $525

CD ROM Drives

4X [SSSPP4XCD] $179 8X [SSSPP8XCD] $299
6X [SSSPP6XCD] $229 10X [SSSPP10XCD] $489

HOT PRODUCTS



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1Gig [SSS1GIG]	$299	2Gig [SSS2GIG]	$439
1.6Gig [SSS1.6GIG]	$399	2.5Gig [SSS2.5GIG]	$499

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MCD

3 1/2" x 1" drive, 10ms 2 year drive warranty, 5 year cartridge warranty. Compatible with SyQuest 270 media.

Internal SCSI with 1 cartridge	$389
External SCSI with 1 cartridge	$449
Parallel Ext with 1 cartridge	$519

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Sound Image Jr 25 Watts	[SPEAKERJR]	$99
Sound Image Pro 35 Watts	[SPEAKERPRO]	$129

SCSI HARD DRIVES

SCSI	Speed	RPM	Brand	Model	Price
1050MB	9ms	5400	Seagate	ST31055N	$339
1080MB	11ms	5400	Seagate	ST51080N	$249
1280MB	12ms	5400	Quantum	FB1280S	$276
2050MB	8.5ms	7200	Micropolis	MC4221	$544
2050MB	8.5ms	7200	Micropolis	MC4221AV	$600
2147MB	9ms	5400	Micropolis	MC4421	$444
2147MB	9ms	5400	Seagate	ST32155N	$559
2147MB	8ms	7200	Seagate	ST32550N	$675
2150MB	8ms	7200	Quantum	XP32150	$630
4290MB	8ms	7200	Seagate	ST15150N	$989
4290MB	9ms	5400	Seagate	ST15230N	$905
4294MB	8.9ms	7200	Micropolis	MC3243	$859
4294MB	8.9ms	7200	Micropolis	MC3243AV	$945
4300MB	8.6ms	7200	Quantum	XP34300	$900
9091MB	12ms	5400	Micropolis	MC1991	$1840
9091MB	12ms	5400	Micropolis	MC1991AV	$1959
9080MB	11ms	5400	Seagate	ST410800N	$1880
WIDE SCSI					
2050MB	8.9ms	7200	Micropolis	MC4221W	$630
2050MB	8.9ms	7200	Micropolis	MC4221WAV	$689
2147MB	8ms	7200	Seagate	ST32550W	$675
2150MB	8ms	7200	Quantum	XP32150W	$680
4294MB	8.9ms	7200	Micropolis	MC3243W	$945
4294MB	8.5ms	7200	Micropolis	MC3243WAV	$1035
4294MB	8ms	7200	Seagate	ST15150W	$1065
4300MB	8.6ms	7200	Quantum	XP34300W	$959
9080MB	11ms	5400	Seagate	ST410800W	$2029
9100MB	12ms	5400	Micropolis	MC1991W	$1929
9100MB	12ms	5400	Micropolis	MC1991WAV	$2049

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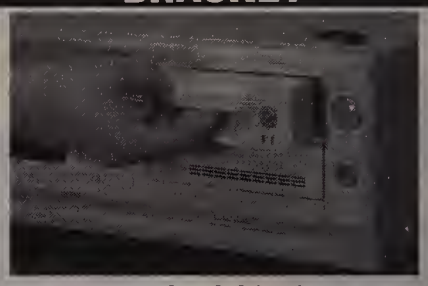
Capacity	Brand & Model	Price
	• SCSI •	
2-4GB	Seagate TSM4000	$309
4-8GB	Seagate TST8000	$399
	• 4mm DAT DRIVES •	
2GB	Hewlett Packard C1534	$609
2GB	Seagate C4320RT	$599
2-4GB	Seagate C4324RP	$679
2-4GB	Hewlett Packard C1536	$699
4-8GB	Seagate C4326NP (DDS2)	$859
4-8GB	Hewlett Packard C1533A	$879
24-48GB	HP External 6 tape loader C1553AX	$2379
	• 8mm DAT DRIVES •	
3.5-7GB	Exabyte EXB8205XL	$1269
7-14GB	Exabyte EXB8505XL	$1889
7-14GB	Exabyte EXB8700LT	$1149
	• QIC •	
800MB	$141	
1GB	$159	
1.7GB	$219	
3.2GB	$249	
4.4GB	$259	

Seagate

Save $10 on these Seagate tape backups with any hard drive purchase.

REMOVABLE DRIVE BRACKET



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	System	Extra Cartridge	Extra Frame
IDE	$79	$39	$49
SCSI	$85	$40	$54
WIDE SCSI	$129	$64	$75

IDE HARD DRIVES

IDE	Speed	RPM	Brand	Model	Price
631MB	14ms	3800	Seagate	ST3630A	$170
639MB	11ms	4500	Western Digital	AC2635	$170
850MB	10ms	4500	Western Digital	AC2850	$179
850MB	14ms	4500	Quantum	TB850A	$179
1080MB	11ms	5400	Seagate	ST51080A	$190
1084MB	14ms	4480	Maxtor	M71084A	$195
1090MB	11ms	4500	Fujitsu	M1614T	$175
1250MB	15ms	3600	Quantum	BF1250A	$189
1280MB	12ms	5400	Quantum	FB1280A	$216
1280MB	10ms	5200	Western Digital	AC21200A	$205
1282MB	10.5ms	5400	Seagate	ST51270A	$195
1330MB	12ms	4480	Maxtor	M71336A	$205
1624MB	10ms	5200	Western Digital	AC31600	$235
1625MB	10.5ms	5400	Seagate	ST31640A	$249
1626MB	12ms	4480	Maxtor	M71626AP	$235
1700MB	11ms	4500	Quantum	SR31700A	$236
2004MB	12ms	4480	Maxtor	M72004A	$279
2100MB	10ms	5200	Western Digital	AC32100	$299
2167MB	10ms	5400	Seagate	ST32140A	$285
2168MB	10.5ms	4500	Quantum	TM32160A	$289
2500MB	15ms	3600	Quantum	BF2500A	$295
2500MB	11ms	4500	Quantum	SR32550A	$335
2559MB	11ms	5200	Western Digital	AC32600	$350
3254MB	10.5ms	4500	Quantum	TM33200A	$369

REMOVABLES

OPTICAL DRIVES

230MB	Fujitsu IDE Bare	$369
230MB	Fujitsu SCSI Bare	$419
640MB	Fujitsu SCSI	Call
650MB	Panisonic PD combination optical & 4X CD ROM	Call
2.6Gig	Maxoptix Int/Ext	$1925/$2025
2.6Gig	HP Int/Ext	$2125/$2225

SYQUEST DRIVES

EZ 135MB •13.5ms, 3600rpm, 128K buffer, 3 1/2" drive
Internal IDE with disk / External SCSI with disk $190/$199
External parallel port with 1 disk $249
NEW 230MB Flyer **$299**
270MB • 13.5ms, 3600rpm, 128K buffer, 3 1/2" drive
Internal IDE (SQ3270A)/ with 1disk (S3270AC) $299/$339
External for parallel port with 1 disk $429
SCSI drive (SQ3270S)/SCSI external(S3270X) $339/$399
200MB •15.7ms, 3220rpm, 64K buffer, 5 1/4" form factor.
SCSI drive (SQ5200)/SCSI external(SQ5200CX) $339/$399

IOMEGA DRIVES

100MB ZIP • 3.5" x 1" high form factor
External SCSI w/ 1 disk $195
Parallel External w/ 1 disk $195
1 Gig JAZ • 3.5" x 1" high form factor
Internal SCSI w/ 1 disk $489
External SCSI w/ 1 disk $589

Adaptec controller A1505CDKIT only $49 when purchased with Zip or Jaz drive.

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960 Utilities
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962 Storage devices

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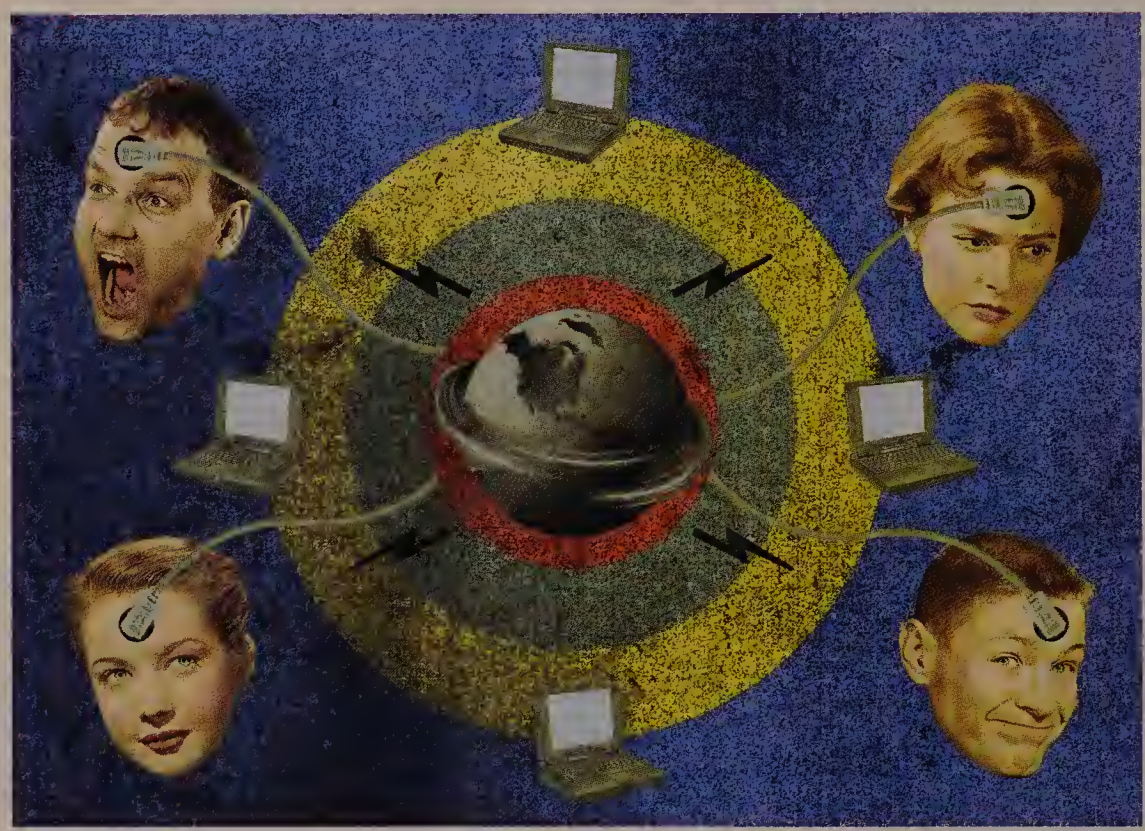

Consumer Watch

I'm Okay, You're Online

BY ROBERTA FURGER

Diana is juggling the demands of managing a small home business and caring for two young children. Francesca and her husband are dealing with infertility. Jim is a widower. It's hard to imagine three situations more different, and yet Diana, Francesca, and Jim have all sought out a similar source of advice, encouragement, and information: online support groups. Throughout all the major online services and the Internet, informal communities are developing among people with common questions and problems—from health-related concerns, such as a personal illness or a sick friend or family member, to questions about parenting, relationships, and employment problems.

Okay, the cynic in you is probably saying, "That sounds way too touchy-feely for me." But don't write off this new form of help too quickly. Hundreds of people who would never dream of baring their souls to a bunch of strangers face-to-face are doing just that online.

"I feel like I can say more online than I ever would in person," says Francesca, who runs an online support forum for couples dealing with infertility. "It's harder to open up to someone when you're looking them in the eyes," she adds. Francesca and her husband log on together to get information about new treatments, catch up with friends they've made online, and share their thoughts, concerns, and questions with other forum members.

The number and variety of support groups is staggering. America Online, CompuServe, Prodigy, and The Microsoft Network all have dozens of high-traffic groups covering a diverse range of topics. One such area is the Better Health and Medical Network on AOL, founded by Elin Silveous in 1993. About a year earlier, Silveous was diagnosed with multiple sclerosis and logged on to all the online services to research her condition. All she found was a smattering of information that was often difficult for a layperson to understand. Support groups were virtually nonexistent at that time. Figuring there were many people in the same boat, Silveous decided to start an online health forum. Her goal? To provide consumers with a supportive environment where they could get up-to-date, easy-to-understand information. The forum now boasts 50 forums, covering both common and obscure health concerns. It logs roughly 1.7 million new entries each month.

INFORMATION SEEKERS

"When a consumer comes in to one of the [health-related] forums, it's usually because either they or a loved one has been diagnosed with a condition," explains Silveous. "They're confused, often scared, even angry, and looking for information." That's where the message boards come in. "They learn they aren't alone. They post a message, share their situation, and other members reach back," explains Silveous.

That same pattern is repeated over and over again, regardless of the nature of the question or problem that draws someone to an online forum. Diana Ennen, cohost of the Work-at-Home forum on AOL's Parent's Soup, says she started participating in online message areas for two reasons: to discover new ways to cope with her hectic work and family life and to share her expe-

FRANCISCO CACERES

riences as a small-business owner. "It's a great way to get a lot of the frustrations out, and to get motivated," says Ennen.

For many people, the ability to participate anonymously is an important part of online support groups, particularly when it comes to sensitive issues like employment-related problems. Whether it's in a public forum or one-to-one online counseling, participants are able to ask questions about harassment, disagreements with a supervisor, or being laid off, without fear of retribution, backlash, or ridicule, says James Gonyea, founder and host of the America Online Career Center, where he provides career counseling. "It's very comforting to be able to go to a professional counselor who doesn't know who you are," says Gonyea, noting that screen name–to–screen name counseling sessions guarantee anonymity and confidentiality.

Many people start by trawling through the message boards, then graduate to one of the live support groups that meet in chat rooms just about every day of the week on all the online services. Jim Lescallette started posting messages on Prodigy's Grief and Death bulletin board after his wife died. "It was a lifesaver for me and has been for many others," says Lescallette, who adds that a small group who met online now meet in person once a year.

LOGGING ON, HOOKING UP

Regardless of your "problem," it's safe to say there's a message forum or an online support group for you. Here are some strategies for finding the right fit.

Explore multiple areas before settling on one. Every message area has its own personality. For Internet newsgroups, subscribe for a couple of days and read the postings or sit in on a group—it won't be long before you find a community that will meet your needs.

Ask for assistance. If you don't see what you're looking for, send e-mail to the host of a related support group or to the customer service staff for the online service, or post a question on a related board. Members are quick to point people in the right direction.

Keep your Internet searches as specific as possible. There are dozens—maybe hundreds—of Internet newsgroups that offer support on everything from stopping smoking to losing weight to coping with cancer. Use a keyword search, such as "smoking and support" to find a group.

TRY IT ON FOR SIZE

Busy schedules, sensitive topics, and the availability of virtually unlimited resources are three great reasons to look for help online. You can log on when and as often as you want—completely anonymously.

"Networking is vital, but it's hard to do on a busy schedule," says Ennen. "I can log on whenever I have time," she notes; "I don't have to dress up and drive somewhere for a meeting, so I'm saving time, and still getting a chance to connect with others in the same situation."

As always, you can contact Consumer Watch *with questions and problems. See page 14 for contact information.*

RESOURCES

Looking for an online support group that meets your needs? Here are some ideas:

➤ **America Online:** Jump to the Health & Fitness Channel (keyword health) or the Better Health and Medical Network (keyword better health). Parents should try Parent Soup (keyword parent soup chat). The Career Center (keyword career center) offers one-on-one counseling and message boards on job-related issues.

➤ **CompuServe:** Type **go ivish** to get to the Health & Fitness area. Also check out **go education** for a parenting area that includes a forum on disabilities.

➤ **The Microsoft Network:** Click on Health and Fitness, then the Health and Fitness Infocenter or the Mental Wellness & Counseling folder. Click on the People & Communities folder. The Special Events folder includes the Breast Cancer Awareness area.

➤ **The Internet:** Search on alt.support for pointers to helpful newsgroups.

Feedback

Bankruptcy Blues

George Miller of Louisville, Ohio, contacted us because he was unable to reach Texas-based CompuAdd. "All the numbers were out of service and I needed help," he says. CompuAdd filed for bankruptcy in February 1996 (see *Breaking News*, May). After a little digging, we learned that when CompuAdd was in business, technical support was outsourced to Memorex Telex in Irving, Texas. The good news is that Memorex Telex will continue to provide support for existing CompuAdd customers until 1998. The number for technical support and on-site service is 800/331-7410. The bad news is that it's going to cost you. If your system is still under warranty, you'll be charged 25 percent of the list price for parts; labor will cost $50 per hour. If your warranty has expired, you'll pay the full price of parts, plus 10 percent; labor charges will be $70 per hour. There are no charges for failures that recur within 30 days. Technical support will cost $30 per incident.

Minor Concession

In response to customer complaints about its fee-based technical support, Compaq has made a small change in policy. Earlier this year, the company announced it would charge $35 per question for any technical support call not involving a product defect (see *Consumer Watch*, May). But no matter what the question was, operators took a credit card number before discussing the problem with you. This angered many customers. Compaq still plans to charge for technical support, but now you will be connected to a technician who will determine if your question will cost you before you must provide a credit card number.

TAKE NOTE: Logitech is celebrating the birth of the 100 millionth mouse. Its inventor, Doug Englebart (who invented the mouse at Stanford Research Institute in 1963) innovates these days at Logitech.

TOP RIGHT: RICK SEALOCK; BOTTOM RIGHT: MARK MATCHO

Cybertoys for Everyone in the House

Retro sounds, money talk, a violent jungle.

Nakamichi's speakers: cute and smart.

FUNNY LOOKS, SERIOUS SOUND

Nakamichi's SP-PD sound system—with two speakers and a subwoofer—may look like an old-fashioned Hoover vacuum, or maybe Tom Servo of *Mystery Science Theater 3000*, but, boy, does it put out serious sound.

The self-powered, biamplified system comes with two featherweight, angle-adjustable satellite speakers for the medium to high frequencies and a subwoofer for bass. The two satellite speakers can be placed on a desk or mounted to the sides of a PC monitor. On top of the right speaker, Nakamichi has thoughtfully included power, balance, and volume controls and an on/off switch so you don't have to scramble for the controls while your family ducks for cover during a loud passage. And when you want to feel as if you're inside a game, not just playing it, the speakers' Sound Retrieval System, a stereo imaging technology from SRS Labs, simulates 3-D sound. They're cute *and* smart; what more can you ask? —*Michael S. Lasky*

- **Nakamichi SP-3D Multimedia Speakers** $199 list; Nakamichi America Corp.; 310/538-8150. Grade: A

  Reader service no. 803

SMARTER FINANCIAL PLANNING

Houses, cars, kids, college, and retirement—can your money keep up with your life? Ask Quicken Financial Planner 2. The program interviews you about your finances, employing a notebook-like structure that is easy to navigate. Then it projects how your money will see you through the years to come, identifying potential problems and suggesting solutions. It goes much further in helping you plan your financial future than the retirement/college calculator in Quicken 5.0.

Some of the lingo in QFP's analyses may confuse novices. But I liked the "What-If" section, where I could quickly see how my financial picture would change if, say, Social Security disappears by the time I retire (it looks grim). QFP's broad reach—it aims at baby boomers with families but doesn't exclude recent college grads or retirees—means it can't go into the exhaustive detail that a human financial planner could; but it can give you a good idea of where you're headed. —*Melissa Riofrio*

- **Quicken Financial Planner 2** $40 street; Windows 3.*x*, Windows 95; Intuit; 800/624-8742, 415/944-6000. Grade: B+

IT'S A JUNGLE OUT THERE

If you're looking for a warm fuzzy jaunt through the jungle with Mowgli and Baloo for your 5- to 9-year-old, this isn't it. In fact, IBM's Jungle Book is a lot closer to Indiana Jones than the Magic Kingdom. The game, based on the recent film starring Jason Scott Lee, consists of over an hour of live action that plays like a movie on your

FEEDBACK CONTINUED

Just a Glitch

We received several complaints from customers of Future Micro in Irvine, California. Jack Fermanian of Wayne, Michigan, wrote to say he ordered products he'd never received (and his credit card had been charged); Konrad Kossman wrote to say he'd never been credited for products he'd returned. We contacted Future Micro to find out what was going on. Company president Michael Reese told us that Future Micro had recently moved and during that time had been unable to ship, receive, test, or return items. He assured us that business is back to normal and that Fermanian, Kossman, and other customers had received what was owed them.

TAKE NOTE: The Internet is beginning to resemble Las Vegas. If you have any doubts, check out the Church of Jesus Christ, Elvis (http://www.stevens-tech.edu/~jformoso/sacred_heart_elvis.html).

Back Up Online

If you're like many people, you worry about losing valuable data off your home computer—but not enough to invest in a backup system. Now CompuServe is offering a way to protect those all-important files using the modem you already have. Through Surefind at go backup, CompuServe will let you back up your files (encrypted and password protected) to their electronic vaults. You download the Surefind software, and the first backup of up to 100MB costs $19.95. After that, you pay $9.95 per month for weekly updates.

Can You Afford It?

Wondering how much mortgage you can handle? Try the mortgage calculator on the Wow online service (800/943-8969). It's called "How Much House Can I Afford?" and is in the Money magazine section. You'll also find other financial calculators there, including "How Much Money Should I Save for Retirement?"

—Christina Wood

Aoife McEvoy contributed to this column.

PHOTO: DANIEL FURON; ICONS: JOHN HERSEY; ILLUSTRATIONS: TOP, MARK MATCHO; BOTTOM, RICK SEALOCK

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computer, complete with screaming monkeys, roaring tigers, and slithering snakes. The goal is to recover King Louie's stolen crown from evil soldiers and return it to Monkey City, guided by Colonel Ilgwom (that's Mowgli spelled backwards—get it?) and his chimp sidekick La Tee. One fun feature: The optional voice recognition tool, which at various points in the game lets kids imitate the cries of monkeys and other animals.

Unfortunately, the game's challenges are limited, and no real learning skills are applied. For example, the choices kids are required to make in response to various perils aren't based on logic or analysis so much as simple trial and error.

Worst of all, the graphic violence in Jungle Book is often extreme—whether it's watching painfully realistic footage of an injured bear or staring down the business end of a revolver. Does this sound like the kind of game you'd want your 5-year-old to play? —*Anne Kandra*

- **Jungle Book** $40 street; Windows 3.*x*, Windows 95; IBM Multimedia Studio, 800/426-7235. Grade: C-

DEEP SLEEP NINE

You've snoozed through the TV space opera, now you can snore right through the game. In Star Trek: Deep Space Nine—Harbinger, you play Federation Envoy Bannik, who arrives at the Deep Space 9 station only to find that the ambassador's been murdered, DS9 is under enemy attack, and worst of all, the turbolift is broken. You must wander DS9's corridors, searching for characters to interact with and playing the occasional phaser-blasting arcade game. The show's actors supply most of the voices, which does help to humanize the game's robotic animation (strangely, the cartoon Captain Sisko is a dead ringer for comedian Martin Lawrence). Alas, installing this DOS dinosaur took me over two hours (and don't even think about running it under Windows 95), and Bannik is so dull he makes even Sisko seem interesting. Serious Trekaholics will probably love this game, but normal humanoids should boldly go somewhere else. —*Daniel Tynan*

- **Star Trek: Deep Space Nine—Harbinger** $55 street; DOS; Viacom New Media; 800/469-2539, 212/258-6000. Grade: C

Reader service no. 804

TRAVEL PREPARED

Do you hate the vague, lost feeling that comes with traveling to a new city? Well, if you're going to Atlanta, Chicago, Los Angeles, New York, Orlando, San Francisco, or Washington, D.C., take the Metro Navigator CD-ROM along. Type in your destination addresses, and—presto—the program produces turn-by-turn directions on how to get there and how long it will take. It will even calculate for rush-hour slowdowns or suggest less-trafficked routes. For each of the seven cities, there's a database of hotels, restaurants, and other attractions with extensive search options, historical information, and Frommer's Guide recommendations. Print out custom maps, find your bank's ATMs, and plan sightseeing itineraries. It's fast, easy to navigate, and prevents panic in the streets. —*Aoife McEvoy*

- **Metro Navigator** $69.99 list; Windows 3.*x*, Windows 95; Philips Media Software; 800/883-3767. Grade: B+

Reader service no. 823

HERE COMES THE PRIDE

It really *is* a jungle out there—especially if you're the king of the beasts. Discovery Channel Multimedia's Savage CD-ROM is your entry into the lions' club. You start out as a cub, stalking butterflies. By the end of the game, you've become a supreme hunter. But there's lots to learn before you get to lunch on wildebeest. You'll have to avoid poachers who want to turn your hide into a bath mat. And if your food, water, and health meters dip too low, you'll quickly reach the end of your rope. On the downside, Savage's interface can be disorienting, and the game's chunky graphics lack the flesh-ripping realism that you'll find in Discovery Channel nature shows. Still, while playing Savage I felt an odd sense of freedom as I loped along the Serengeti Plain, as well as an overwhelming hunger for zebra meat. —*Daniel Tynan*

- **Savage** $49.95 list; Windows 3.*x*, Windows 95; Discovery Channel Multimedia; 800/678-3343, 317/579-0413. Grade: A-

Reader service no. 806

The Jungle Book is too violent for many kids.

A DOG NAMED BLUE

A well-written mystery book can capture a child's imagination and attention for hours. Elroy Hits the Pavement, the new CD-ROM game from Headbone Interactive, demonstrates that an inventive computer game can be just as compelling. Elroy is one of a new breed of kids' games called *interactive adventures* that puts kids in the driver's seat. Elroy and his savvy sidekick Syd are on the prowl in search of Elroy's dog Blue, who's been kidnapped by thugs. The plot takes various twists and turns, depending on how closely you follow the clues. Pay close attention and you'll wind up recovering the dog and squashing the criminals, but one wrong step and the jig's up. It's pure fun. —*Roberta Furger*

- **Elroy Hits the Pavement** $30 street; Windows 3.*x*, Windows 95; Headbone Interactive, 800/267-4709, 206/323-0073. Grade: A

Reader service no. 807

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Newcomers Meet With Tough Challenge

Only one new machine manages to find room among the Top 5.

BY KIRK STEERS

This month the HP Pavilion 7170—providing a sweet combination of features and price—managed to eke its way into the number four position on the Top 5 Home PCs chart. The other machines on the list, however, fought off all challengers—including a decked-out Quantex P-133 with an 8X CD-ROM drive, a 17-inch MAG monitor, and snappy performance. Priced at a competitive $2349, the Quantex QP5/133 M-4 was kept out of the running by lagging service and reliability scores. The systems on the chart offer great reliability as well as good prices (which are dropping all the time) and the latest technology.

The Dell Dimension P-100t is definitely the machine of choice if you're on a tight budget. The $1999 price combined with Dell's solid service and reliability keep this system at the top of the chart. And even though it's no Pentium-166, in our testing this P-100 machine outperformed many systems with meatier CPUs. While not heavily laden with fancy extras, it does come with Microsoft Office Professional.

Micron's Home MPC Pro gives you plenty for your money. The $3197 system is the fastest home machine we've tested and includes a 17-inch monitor. But it's not the easiest machine to assemble and configure. The Home MPC Pro comes with Microsoft Office instead of an integrated package like Microsoft Works. You can buy this one only through the mail.

HP's Pavilion 7130P, from a company with a stellar reputation for reliability, boasts a curvy sports-car look. It's a snap to set up, and the custom interface guides novices around the system. Best of all, the built-in, snapshot-size color scanner and EasyPhoto software will have you building a digital photo album in seconds.

Squeaking into the Top 5 this month is **HP's Pavilion 7170**. This $3248 top-of-the-line home system can serve as both a family and home office PC. The 7170's P-166 processor, 2GB hard drive, and full-duplex speakerphone/answering machine give it the mettle to tackle tough business and multimedia tasks. A solid software package includes Quicken and Encarta.

The Compaq Presario 9240 is a 133-MHz Pentium machine that boasts our favorite feature: a rewritable PD-CD-ROM drive that looks like an ordinary unit but works two ways—it's a 4X CD-ROM drive and a rewritable optical drive. Once you're done playing Myst, pop in a special disc and copy up to 650MB to it. (Extra discs sell for around $40 apiece.)

Kirk Steers is a contributing editor for PC World.

TOP 5 HOME PCs

	Price	Overall rating	Reliability/service rating	PC WorldBench score	Setup rating	Multimedia compatibility	Extra-value points	CPU	RAM (MB)	Hard drive (GB)	CD-ROM drive	Reader service number
1 Dell Dimension P-100t 800/613-3355	$1999	75	77/77	150	58	95	1 [1]	P-100	16	1	6X	642
2 Micron Home MPC Pro 800/223-6571	$3197	74	76/69	194	73	95	7 [2]	P-166	16	1.2	6X	643
3 Hewlett-Packard Pavilion 7130P 800/724-6631	$2948	74	78/68	126 [3]	88	100	6 [4]	P-133	16	1.6	4X	645
4 Hewlett-Packard Pavilion 7170 800/724-6631	$3248	73	78/68	168	88	100	3 [5]	P-166	16	2	6X	646
5 Compaq Presario 9240 800/345-1518	$2998	73	76/68	147	78	100	6 [6]	P-133	16	1.2	4X	644

Test systems include a 15-inch monitor and a 28.8-kbps modem, unless otherwise noted.

BEST BUY

[1] Microsoft Office 95 Professional.
[2] 17-inch monitor, Iomega Zip drive (not standard), Microsoft Office.
[3] We tested a prototype; shipping unit may be faster.
[4] Answering machine, built-in color scanner, image editing software.
[5] Answering machine, hardware MPEG, wavetable sound.
[6] Answering machine, rewritable PD-CD-ROM drive.

For more information about all products in this article, circle reader service no. 905.

Methodology The overall rating includes ratings for reliability and service (30 percent), price (20 percent), PC WorldBench test results (20 percent), setup (10 percent), multimedia compatibility (10 percent), and extra-value items (10 percent). Reliability and service ratings are based on results of PC World's Reliability and Service Monitor survey. For a description of the PC WorldBench 1.0 tests, see the Test Report in this month's system review. We allowed 100 points for the setup rating, which is based on clarity of documentation and quality of user interface. To derive the multimedia compatibility scores, we evaluated the installation and use of five popular multimedia titles and six applications for a maximum score of 100. Extra-value points are given for hardware and software that set a machine apart from the competition. For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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Circle 81 on reader service card

Generating Ideas in a SOHO

Working from home doesn't mean you're alone.

BY STEVE BASS

My home-based business boasts great parking, an executive dining room (good food, lousy service), and no office politics. On the downside, there's no one to bounce ideas off of or to evaluate my decisions. Luckily, I've found some programs that, while they don't replace a creative staff, do help me get my thoughts together.

I can make simple yes-and-no decisions on my own without straining the Bass family trust; tackling complex issues requires more. So I looked at a program called DecideRight, which claims to have "revolutionized decision making." I usually decide to avoid such hype, but this time I decided otherwise. It was the right decision.

Instead of testing DecideRight on a business problem, I tried something more domestic: buying a new stereo receiver (hey, these days it's as perplexing as buying a computer). I started by entering receiver brand names, then added criteria such as "fancy-looking dials" and "lots of flashing lights" (okay, they were more like "price," "warranty," and "number of speakers"). I assigned each criterion a weight based on its importance, then rated each receiver by each criterion. DecideRight analyzed my input, providing a detailed graphical table indicating the best choice. It also graded each option as 'Excellent', 'Good', 'Fair', or 'Poor'. And yes, I did buy the highest-rated receiver.

DecideRight is one of those rare programs that are designed right. For instance, wherever I may be in the decision-making process, I can play "what if," easily going back and, say, adding a new variable or changing a weighting. And the program takes less than 4MB of disk space.

DecideRight even has useful pop-up tips to help you through the more difficult tasks, but these aren't as handy as they could be. You can't keep a pop-up window on screen while you follow its instructions.

The program has 16 samples for decisions like choosing a college or comparing copying machines; many more are available from the vendor's Web site. The site also has a free DecideRight Viewer (you can work with existing models but can't create your own). DecideRight is a Windows 3.*x* program that runs fine under Windows 95.

GETTING INSPIRED

Like most writers, I rely on my mortgage payment for inspiration. But this month, I bought Inspiration, a flexible outlining and diagramming program that helps organize my creative process. Inspiration can't supply me with ideas, of course (don't I wish it could!), but it graphically helps me arrange them, letting me drag and drop them around the screen until they make sense.

I tried Inspiration to help put this column together, typing ideas as fast as they came to mind. Then I moved the parts around—adding and removing ideas—until the column structure flowed. Once I was happy with the result, I printed it and exported it to Word for Windows.

Inspiration is a valuable tool, enough so that it's become a permanent resident on my hard disk. At the same time, I think the company could have made it a little more intuitive. For example, I'd love to see a step-by-step tutorial and multilevel undo.

The only thing I need now is a good maitre d' for my executive dining room.

- **DecideRight** $90 street; Avantos Performance Systems; 800/282-6867, 510/654-4600; http://www.avantos.com
  Reader service no. 724
- **Inspiration** $129 street; Inspiration Software Inc.; 800/877-4292, 503/297-3004; http://www.inspiration.com/
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Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 14 for contact information.

TALK TO US: You can e-mail the editors of the PC World @Home section at home@pcworld.com, and write to us at 501 Second St. #600, San Francisco, CA 94107. We're eager to hear your responses and opinions about any topic related to home computing.

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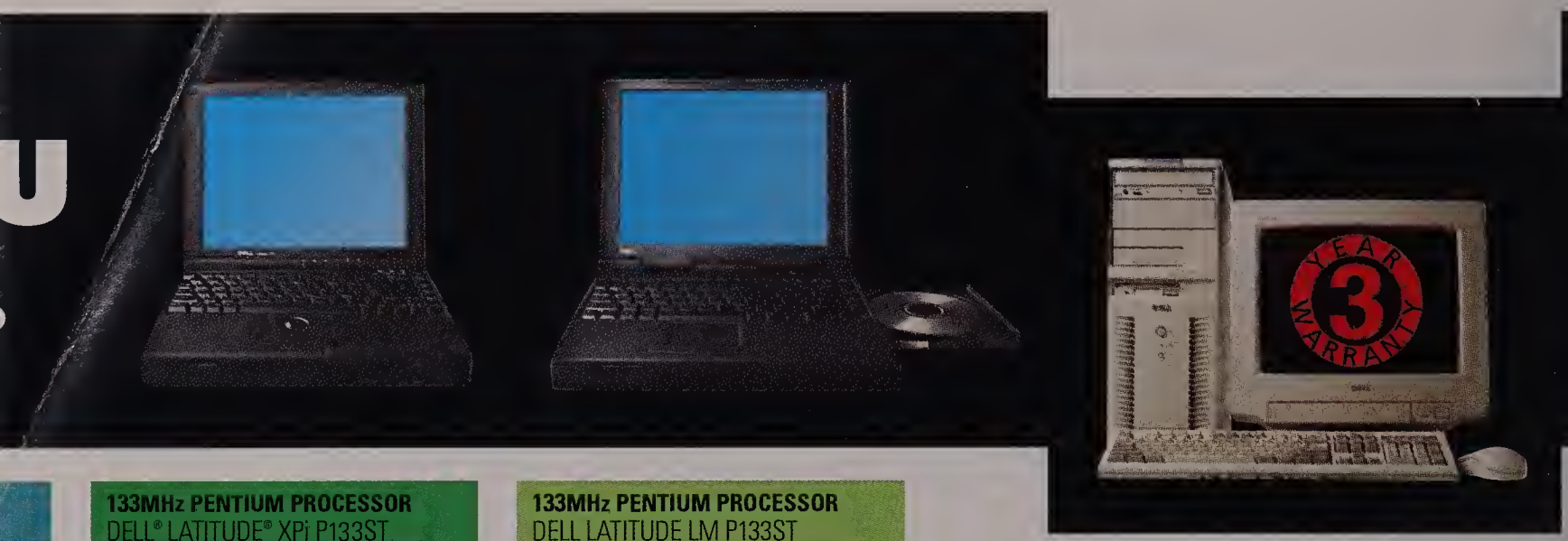

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